

ADDENDA

TOWN OF HILLSBOROUGH
REQUEST FOR PROPOSAL
Audio Visual System Update
HILLSBOROUGH, CALIFORNIA, 94010

This addendum changes the FOLLOWING:

- 1. Section II, F. "RFP" Schedule: The Schedule is amended as shown in **Attachment 1** and as follows:
 - a. Addendum to the RFP Posted: 5 p.m. on 2/13/19
 - b. Proposals Due: 5 p.m. on 2/19/19
- 2. SECTION 27 41 16, INTEGRATED AUDIOVISUAL SYSTEMS AND EQUIPMENT, Part II PRODUCTS, Section F. CONTROL SYSTEM AND RELATED, Subsection 6. Switcher, High Definition Video and MultiMedia 16x16 is amended as shown in **Attachment 2** (highlighted in yellow).
- 3. TA-101 and TA-701 are amended as shown in Attachment 3

Addendum No. 1, issued on **February 13, 2019**

ADDENDUM ACKNOWLEDGEMENT	
Proposer acknowledges receipt of this addendum, which shall be attached to the proposal.	
PROPOSER'S REPRESENTATIVE	DATE

Attachment 1

Section II., F. RFP Schedule

The tentative schedule is amended as follows:

Action	Deadline		
	Time	Date	Day
Release of Request of Proposal	5 p.m.	1/11/2019	Friday
Mandatory Pre-Proposal Meeting	11 a.m.	1/25/2019	Friday
Proposer Questions Submittal Deadline	5 p.m.	2/1/2019	Friday
Town Questions Response	5 p.m.	2/8/2019	Friday
Addendum to the RFP Posted	5 p.m.	2/13/2019	Wednesday
Proposals Due	5 p.m.	2/19/2019	Tuesday
Tentative Interview	9 a.m.	2/22/2019	Friday
Authorization to Negotiate Contract	5 p.m.	3/12/2019	Tuesday
Prepare/Execute Contract	TBD	4/3/2019	Wednesday
Project Kick-off Meeting	TBD	4/5/2019	Friday
Anticipated Construction Start	8 a.m.	4/11/2019	Thursday
Project Substantially Complete	5 p.m.	5/10/2019	Friday
Training	TBD	TBD	TBD
Project Complete	5 p.m.	6/5/2019	Wednesday

Attachment 2:

SECTION 27 41 16, INTEGRATED AUDIOVISUAL SYSTEMS AND EQUIPMENT, Part II PRODUCTS,
Section F. CONTROL SYSTEM AND RELATED, Subsection 6. is amended as follows:

SECTION 27 41 16

INTEGRATED AUDIOVISUAL SYSTEMS AND EQUIPMENT

PART 1 - GENERAL

A. SECTION INCLUDES

1. Provide all labor, materials, transportation and equipment to complete the furnishing, installation, assembly, set up, and testing of the Sound and Audiovisual System work indicated on the drawings and specified herein. Notwithstanding any detailed information in this Section, provide complete, working systems.
2. Design, engineer and provide complete, all means of support, suspension, attachment, fastening, bracing, and restraint (hereinafter "support") of the Work of this Section. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction.

B. AUDIOVISUAL SYSTEMS AND EQUIPMENT

1. Provide the following, in addition to work shown on the drawings, along with any additional equipment and accessories required for a complete, working system:
2. Install (N) audiovisual, broadcast production, DSP, and control systems and equipment in all spaces shown on documents.
3. Develop user interface for control systems with Town Representatives familiar with the operation of Assemblies, Performances, and other Events within the spaces. Provide system programming, training, and support to Town during first-substantial-use of (N) systems and equipment.
4. Loudspeaker/Audio Processing, general:
 - a. Program audio and speech content to output through overhead loudspeakers.
5. Racking compartment, general:
 - a. Provide blank plates at all unused openings.
 - b. Provide fans as required to keep the interior of each equipment rack at a temperature at least 5-10 degrees cooler than equipment manufacturer's recommended operating temperature.
 - i. Fans to emit not more than 30 dB of noise.
6. Control Systems, general:
 - a. Review all push button and touch panel button nomenclature with Town Representative prior to system programming.
 - b. Provide graphic indication of program volume level on control touch panel when volume control is selected.
 - c. Provide Main Menu selection button on all touch panel screens to route user back to main touch panel menu.
 - d. Provide Secure, Tiered access to audiovisual functionality for non-Council uses of the Chambers, including public meetings, training sessions, exercise classes, movies, and simple (e.g. no dais) presentations. Review anticipated usage scenarios with Town Representative to develop selective access to limited room AV functions for non-technical users for non-Council functions.

7. Control Functions:
 - a. Control: Confirm all control functions and layouts with Town Representative prior to system programming.
 - b. Wall Control:
- i. General: Functions to operate by scene/mode, not by device.
- ii. End user selection of a single A/V input source (push buttons) automates:
 - a) Projections screen lowers.
 - b) Projector turns on.
 - c) Presets recalled.
 - d) Sets audio chain to loudspeakers.
- iii. End user selection on an Audio Only input automates:
 - a) Sets audio chain.
- iv. Touch Panel Menus:
 - a) Startup Page: "Press here to Begin"
 - b) Home Page:
 - (1) "Select Source": provides sub-menus of source selections.
 - (2) "Controls": Provides sub-menu of:
 - (a) Screen up/down control.
 - (b) Individual projector on/off control.
 - (3) "Power Off": Provides sub-menu selection of "Do you want to power off the system?" with "Yes" and "No" selections. Upon selection of "Yes", menu reads "Please wait, shutting down system."
 - c) All menus, except Home Page, to include "Home" button to revert back to Home Page.

C. REFERENCE STANDARDS

1. Conform to the applicable portions of the current standards published by these organizations:
 - a. SMPTE Society of Motion Picture and Television Engineers.
 - b. NAB National Association of Broadcasters.
 - c. EIA Electrical Industries Association of America.
 - d. UL Underwriters Laboratories.
 - e. AES Audio Engineering Society.
 - f. NEC National Electrical Code.
 - g. UBC Uniform Building Code.
 - h. NFPA National Fire Protection Association.
 - i. EIAJ Electrical Industries Association of Japan.
 - j. IEC International Electrotechnical Commission.
 - k. FCC Federal Communications Commission.
 - l. NTC Network Transmission Committee of the Video Transmission Engineering Advisory Committee.

- m. NCTA National Cable Television Association.
 - n. BTSC Broadcast Television Stereo Committee.
 - o. TASO Television Allocation Study Organization.
2. Conform additionally to the following specific standards:
- a. American National Standards Institute (ANSI)
 - i. ANSI S1.4-1983 (R2001) American National Standard Specification for Sound Level Meters
 - ii. ANSI S1.11-1986 (R2001) American National Standard Specification for Octave-Band and Fractional Octave-Band Analog and Digital Filters
 - iii. ANSI S1.42-1986 (R2001) American National Standard Design Response of Weighting Networks for Acoustical Measurements
 - iv. ANSI IT 7.214-89 Audio-visual Systems - Front Projection Screens (Tripod/Free-Standing) - Methods for Testing and Reporting Performance Characteristics.
 - b. Audio Engineering Society Incorporated (AES)
 - i. AES2-1984 (r1997) AES Recommended Practice Specification of Loudspeaker Components Used in Professional Audio and Sound Reinforcement
 - ii. AES5-1998 (Revision of AES5-1984) AER recommended practice for professional digital audio – Preferred sampling frequencies for applications employing pulse-code modulation
 - iii. AES14-1992 (r1998) AES standard for professional audio equipment – Application of connectors, part 1, XLR-type polarity and gender
 - iv. AES20-1996 AES recommended practice for professional audio – Subjective evaluation of loudspeakers
 - v. AES26-2001 Revision of AES26-1995 AES recommended practice for professional audio interconnections – Conservation of the polarity of audio signals
 - vi. AES-R2-1998 AES project report for articles on professional audio and for equipment specifications – Notations for expressing levels
 - c. Electronic Industries Association of America (EIA)
 - i. EIA-160 Sound Systems
 - ii. EIA-310-E Racks, Panels and Associated Equipment
 - iii. EIA-101-A Amplifiers for Sound Equipment
 - iv. SE-103 Speakers for Sound Equipment
 - v. SE-104 Engineering Specifications for Amplifiers for Sound Equipment
 - d. International Electrotechnical Commission (IEC)
 - i. IEC 268-3 (1988) Sound system equipment – Part 3: Amplifiers
 - ii. IEC 268-5 (1989) Sound system equipment – Part 5: Loudspeakers
 - iii. IEC 268-12 (1987) Sound system equipment – Part 12: Application of Connectors for Broadcast and Similar Use
 - iv. IEC 651 (1979) Sound level meters
 - e. International Organization for Standardization (ISO)

- i. ISO 1996-1 Acoustics – Description and measurement of environmental noise – Part 1: Basic quantities and – Composite Analog Video Signal – NTSC for Studio Applications
 - f. Federal Specifications (FS)
 - i. GG-S-00172D Screen, Projection. Federal Supply Classification (FSC) 670.
 - g. Federal Standards (Fed-Std)
 - i. 191A Textile Test Methods.
 - a) 5760 Mildew Resistance of Textile Materials; Mixed Culture Method.
 - b) 5903.1 Flame Resistance of Cloth; Vertical.
 - h. NFPA
 - i. 255 Method of Testing Surface Burning Characteristics of Building Materials.
 - ii. 701 Methods of Fire Tests for Flame-Resistant Textiles and Films.
 - i. Society of Motion Picture Engineers (SMPTE).
 - i. SMPT 196M-86 Motion Picture - Screen Luminance and Viewing Conditions - Indoor Theater Projection Guide.
 - ii. SMPTE 202M-1998 Motion Pictures – B Chain Electroacoustic Response – Dubbing Theaters, Review Rooms and Indoor Theaters
 - iii. SMPTE RP167-1995 Alignment of NTSC Color Picture Monitors
 - iv. SMPTE EG1-1990 Alignment Color Bar Test Signal for Television Picture Monitors
 - v. SMPTE EG27-1994 Supplemental Information for ANSI/SMPTE 170M and Background on the Development of NTSC Color Standards (R1999)
 - vi. RP 94 Recommended Practice for Gain Determination of Front Projection Screens.
 - vii. SMPTE RP 95 Recommended Practice for Installation of Gain Screens.
 - viii. SMPTE RP 98 Recommended Practice for Measurement of Screen Luminance in Theatres.
 - j. Underwriters Laboratories Incorporated (UL)
 - i. UL 813 Commercial Audio Equipment 1996
 - ii. UL 1419 Professional Video and Audio Equipment 1997
 - iii. UL 1492 Audio-Video products and Accessories 1996
 - iv. UL 6500 Audio/Video and Musical Instrument Apparatus for Household, Commercial and Similar General Use 1999

D. RELATED WORK IN OTHER SECTIONS

- 1. Section 27 41 01 – Grounding and Bonding for Audiovisual Systems
- 2. Section 27 41 02 – Hangers and Supports for Audiovisual Systems
- 3. Section 27 41 03 – Conduits and Backboxes for Audiovisual Systems
 - a. Raceway system for work of this Project, including floorboxes.
- 4. Section 27 41 06 – Noise and Vibration Controls for Audiovisual Systems
 - a. Outlet box pads for the work of this Project.

5. Section 27 41 07 – Identification for Audiovisual Systems
6. Section 27 41 08 – Audiovisual Cabinets, Racks, Frames
 - a. Floor Mounted and Casework Equipment Racks for the work of this Section.
7. Section 27 41 09 – Audiovisual Cable Management

E. QUALITY ASSURANCE

1. Test Equipment - Refer to 27 41 00:
 - a. Sound Systems:
 - i. Wide band oscilloscope, 50 MHz, analog. (Example: Tektronix TAS-250 or 2212).
 - ii. True RMS audio digital volt-ohm-millimeter (Example: Fluke 8060A).
 - iii. Integrated audio test set (Example: Audio Precision or Neutrik A1 or A2 System).
 - iv. Acoustic polarity tester (Example: BSS Audio Ltd. Phasecheck System AR 130).
 - v. Pink Noise generator (Example: Ivie IE-20B).
 - vi. Calibrated microphone and pre-amplifier assembly (Example: Ivie IE-2P preamplifier/power supply with Ivie/ACCO, Bruel & Kjaer, or Larson-Davis microphone capsule).
 - vii. Real time audio spectrum analyzer, one-third octave (Example: Ivie IE-30A or JBL Smaart system).
 - viii. Frequency/time audio analyzer (Example: Crown TEF system or JBL Smaart system).
2. Baseband Video Systems:
 - a. Wide band oscilloscope, 50 MHz, analog. (Example: Tektronix TAS-250 or 2212).
 - b. Analog composite test generator (Example: Tektronix TSG 170A or TSG 100 Opt. 01).
 - c. Analog composite waveform/vector monitor (Example: Tektronix 1740A or WFM 90.)
3. RGBHV Wideband Component Analog Video Systems:
 - a. Wide band oscilloscope, 200 MHz, analog. (Example: Tektronix TAS-485).
 - b. RGBHV test generator (Example: Extron VTG 100).
4. Projection Systems:
 - a. Luminance meter. (Example: Tektronix J17/J18 with J1803 8 degree luminance head.).
 - b. Grey scale chart.
 - c. Precision optical comparator. (Example: Phillips or Tektronix J17/J18 with J1810/J1820 chromatiTown head.).
5. High-bandwidth Digital Content Protection (HDCP) check
 - a. Quantum Data 882E HDMI-HDCP Compliance Test Tool

6. Any other items of equipment or materials required to demonstrate conformance with the Contract Documents.

F. SUBMITTALS

1. Conform with Section 27 41 00 - Common Work Results for Audiovisual Systems

G. CONFLICTS

1. Present any conflicts between codes, regulations, specifications and/or requirements at least thirty (30) days prior to the commencement of the scheduled work.

H. SYSTEM PERFORMANCE REQUIREMENTS, AUDIO-VISUAL SYSTEM

1. Using the listed test equipment, document that the installed systems meet or exceed the performance standards below.
2. Audio Playback and Sound Reinforcement Systems:
 - a. Electrical Performance; Source Input to Power Amplifier Output:
 - i. Frequency Response (Equalizer flat): +0.5 dB 30 Hz to 15 kHz.
 - ii. Total Harmonic Distortion (THD): Less than 0.5%, 30 Hz to 15 kHz, +4 dBm line level.
 - iii. Signal to Noise: At least 70 dB, 30 Hz to 15 kHz, referenced to input of +4 dBm.
 - iv. Crosstalk: At least -60 dB, 30 Hz to 15 kHz.
 - b. Electro/Acoustic Performance:
 - i. Uniformity of Coverage: ± 4 dBA, 5 feet above the floor.
 - ii. Minimum Sound Pressure Level at Center of Target - at indicated aiming point, down centerline of device. 83 dBA, 5 feet above the floor.
 - c. Equipment: Specified individually.
 - d. Audio Signal Path: Shall not degrade performance of connected equipment.
3. Video Systems:
 - a. Video Signal System: NTSC to EIA RS-170A, except as noted.
 - b. Video Signal Path: To EIA RS-250B short haul where equalized, otherwise to the performance limit of the specified video cable.
4. RGBS Video Systems:
 - a. Video Signal: Pass 300 Hz to 120 MHz sine wave from any input to any output with losses of less than 1 dB over cable loss at cable manufacturer specified performance points without amplification.
5. Projection and Display Systems:
 - a. Consistent with performance of specified displays, projectors and screens.
 - b. Brightness, convergence per ANSI standard procedures for device.
6. High-bandwidth Digital Content Protection (HDCP) check
 - a. At spaces with HDMI transmission:
 - i. Run HDCP check to ensure all devices are HDCP compliant.
 - ii. Test with sample source device with quantity of HDCP keys as required to operate by the system.

I. TRAINING

1. Conduct training on completed system at reasonable convenience of the Agency during normal business hours.
2. Operator Training: Sixteen (16) hours.
3. Initial Use Support: Provide standby trainer/system engineer during two (2) system uses, each not to exceed four (4) hours of training.

J. DEFINITIONS

1. Definitions of Terms: The following definitions and conditions apply to each of the respective parameters and the measurements of those parameters, unless specifically stated otherwise:
 - a. Frequency Response: The minimum acceptable frequency band over which the amplitude response is within 3 dB (or any specified range), or the specified limits of the response relative to the reference frequency (1 kHz for audio, 1.0 MHz for video) under design load conditions, at any operating level up to and including the specified maximum output while fully in compliance with all other performance specifications.
 - b. Maximum Output Level: The minimum acceptable maximum signal output level (voltage, current or power) attained under design load conditions attained while fully in compliance with all other performance specifications.
 - c. Harmonic Distortion: The maximum acceptable harmonic distortion measured at any operating level, up to and including the specified maximum output, with an applied sine wave signal of any frequency in the range of the specified frequency response.
 - d. Audio Intermodulation Distortion: The maximum acceptable intermodulation distortion resulting from the introduction of 60 Hz and 7 kHz signals in a ratio of 4:1 under design load conditions at any operating level up to and including the specified maximum output level.
 - e. Signal to Noise Ratio: The minimum acceptable ratio of signal to noise levels derived from broadband measurements under design load at maximum output over the entire range of the specified frequency response.
 - f. Clipping Level: The minimum acceptable maximum level of signal applied to the device under design load conditions while fully in compliance with all other performance specifications.
 - g. Sensitivity: The maximum acceptable level of input signal applied to the device that is necessary to provide the maximum output under design load conditions.
 - h. Design Load: The load (in ohms) specified by usage of the particular device input or output.
 - i. Composite Triple Beat Ratio: The ratio of visual carrier level to composite third order distortion products.
 - j. Cross Modulation Ratio: The ratio of visual carrier level to coherent spurious signal level (i.e. intermodulation products).
 - k. Carrier to Noise Ratio: The ratio of visual carrier to noise levels derived from broadband measurements under design load at maximum output over the entire range of the specified frequency response.
2. Signal Levels: The following voltage levels shall be considered the standard operating levels for the particular circuitry, unless specifically noted otherwise (0.775 Volt = 0 dBu = 0 dbm for a 600 ohms terminated circuit):

- a. Microphone Circuits: -30 dBu or less.
 - b. Audio Line Level Circuits: -30 dBu to +24 dBu; equivalent to -30 dBm to +24 dBm for a 600 ohms terminated circuit.
 - c. Loudspeaker Level Circuits: More than +24 dBu.
 - d. Video Line Level Circuits: 1.0 Volt, peak to peak composite signal.
 - e. Radio Frequency (RF), Television (KMVT) Circuits: +6 to +72 dBmV (0 dBmV = 1,000 microvolts).
3. Characteristic Impedances: The following operating impedances shall be considered to be the standard operating impedances for the particular circuitry, unless specifically noted otherwise:
- a. Microphone Circuits: 50-250 ohms source, 150-1500 ohms terminating, electrostatically and electromagnetically balanced to ground.
 - b. Audio Line Level Circuits: 600 ohms maximum source, 600 ohms minimum terminating, line to line, electrostatically and electromagnetically balanced to ground.
 - c. Video Line Level Circuits: 75 ohms maximum source, 75 ohms minimum terminating to shield and signal ground, with Vertical Standing Wave Ratio (VSWR) not to exceed 1.2.
 - d. Radio Frequency (RF) Television Circuits: 75 ohms nominal to shield and signal ground, with Vertical Standing Wave Ratio (VSWR) not to exceed 1.2.

K. SOFTWARE LICENSING

- 1. Provide licensing for project specific software programming at programmable devices.
- 2. Provide licensing and original software copies for each device provided under Work of this Section that uses software for operation, configuration or control.
 - a. Provide licensing for required workstation operating systems, and required third party software.
 - b. For the Control System, provide a complete copy of the source code, including the device interface driver code modules.
- 3. Upgrade each software package to the release in effect at the end of the Warranty Period.

PART 2 - PRODUCTS

A. DISTRIBUTED LOUDSPEAKER ASSEMBLIES AND RELATED

- 1. 4" Loudspeaker Assembly - 70V Coupled, Accessible Ceiling
 - a. Drawing Reference: SA
 - b. Complete Assembly to consist of:
 - i. Four-inch loudspeaker.
 - ii. Seventy volt tap transformer.
 - iii. Ceiling baffles with 1" wide maximum steel trim ring at the baffle perimeter, fine perforated mesh over the remainder of the baffle, blind studs for mounting loudspeaker, and torsion spring for blind attachment of baffle to enclosure. The baffle can mount to the enclosure through ceilings up to 2" thick.
 - iv. Round recessed steel enclosure, with damping compound to prevent metallic resonance.
 - v. Manufacturer
 - a) Crestron Saros ICI4T-W-T
 - b) JBL Control

- c) Or equal
- 2. Chambers Ceiling Loudspeakers
 - a. Drawing Reference: SR
 - b. Complete assembly consisting of:
 - i. Compact, full-range remotely powered loudspeaker and harness.
 - ii. Proprietary cabling and termination at loudspeakers and head-end in Rack R33.
 - c. Manufacturer:
 - i. Meyer MM4-XP
 - ii. No known equal.

B. POWER AMPLIFIERS AND RELATED

- 1. Power Amplifiers, General
 - a. Drawing Symbol: PA [number].
 - b. Provide the following functions and/or features
 - i. Employ solid state devices (integrated circuits and/or transistors) throughout and employ positive protection of circuit components.
 - ii. With amplifier input driven 10 dB beyond input level required to produce full rated output, amplifier shall withstand for at least 15 seconds any of the following load conditions without instability or operation of main over current protection (i.e. no blown fuses or circuit breakers).
 - a) "Short" circuit of 0.1 ohm.
 - b) Open circuit (no load).
 - c) Standard Reactive Load: 5.4 ohms in series with the parallel combination of 12.5 microhenrys; 800 microfarads and 18.3 ohms resistive.
 - iii. Peak voltage of turn-on and/or turn-off transients not greater than 20 dB below maximum rated amplifier output.
 - a) Time duration of transients not to exceed 3 seconds.
 - iv. Input level controls for each output channel to be calibrated, stepped attenuators with at least 50 dB range.
 - a) For 0 to 34 dB of attenuation, steps not to be greater than 2.0 dB.
 - b) Attenuators to track calibration within 0.5 dB.
 - c) Stepped attenuators are not required at Power Amplifiers where the connected driving source device includes a precision attenuator under digital control with precision not less than that specified herein.
 - v. Input Connectors: XLR connector or tip sleeve (standard) phone jack or barrier strip.
 - vi. Output Connectors: Standard 0.75 inch spacing "5-way" binding posts, or barrier strip.
 - vii. Where integral cooling fans are provided, such fans shall have a minimum life rating of 50,000 hours at 25 degree Centigrade ambient temperature.
 - viii. Where indicated, provide balanced input, differential or transformer. Provide matching accessory to implement if not a standard feature of the product provided.
 - ix. Listed by a Nationally Recognized Testing Laboratory.
 - c. Minimum performance requirements with all channels driven

- i. Power Output Per Channel: As scheduled on Drawings as Minimum Amplifier (Min Amp) and specified below; continuous average sine wave power into 70 Volt line over a bandwidth of 40 Hz to 20 kHz.
 - a) Frequency Response: plus 0 dB, minus 0.5 dB, 40 Hz to 20 kHz at rated output.
 - b) Total Harmonic Distortion: Less than 0.25 percent at rated output, 40 Hz to 20 kHz.
 - c) Intermodulation Distortion: Less than 0.04 percent at rated output using frequencies of 60 Hz and 7 kHz, mixed in a ratio of 4:1.
 - d) Input Impedance: 15,000 ohms minimum; unbalanced, or balanced as shown on drawings.
 - e) Hum & Noise: At least 94 dB signal-to-noise ratio.
 - f) Channel Separation: At least 75 dB at 1 kHz.
 - g) Phase Shift: Less than plus 20 degrees from 20 Hz to 20 kHz.
 - h) D.C. Offset: Less than 10 millivolts.
- 2. Power Amplifiers, 2 Channel, Low Impedance
 - a. Drawing Symbols
 - i. PA 25
 - ii. PA100
 - iii. PA200
 - iv. PA300
 - b. Comply with Power Amplifiers, General, in this Section.
 - c. Power Output Per Channel, continuous average sine wave power into 8 ohm voice coil impedance, not less than:
 - i. PA25, 25 Watts
 - ii. PA100, 100 Watts
 - iii. PA200, 200 Watts
 - iv. PA300, 275 Watts
 - d. Dimensions
 - i. PA 25, not to exceed 1 rack unit for 2 channels.
 - ii. PA100, PA200 and PA300, not to exceed 3 rack units for 2 channels.
 - e. Manufacturer, PA25
 - i. Crown D-45
 - ii. Stewart Electronics
 - iii. Or equal
 - f. Manufacturer, PA100
 - i. Crown CL1
 - ii. Crown Cdi in low impedance mode.
 - iii. QSC
 - iv. Stewart Electronics
 - v. Electro-Voice
 - vi. Peavey

- vii. Or equal
 - g. Manufacturer, PA200
 - i. Crown CL1
 - ii. Crown Cdi in low impedance mode.
 - iii. QSC
 - iv. Stewart Electronics
 - v. Electro-Voice
 - vi. Peavey
 - vii. Or equal
 - h. Manufacturer, PA300
 - i. Crown CL1
 - ii. Crown Cdi in low impedance mode.
 - iii. QSC
 - iv. Stewart Electronics
 - v. Electro-Voice
 - vi. Peavey
 - vii. Or equal
- 3. Power Amplifiers, 2 Channel, 70 Volt
 - a. Drawing Symbol
 - i. PA50-70
 - ii. PA100-70
 - iii. PA200-70
 - iv. PA300-70
 - v. PA800-70
 - b. Comply with Power Amplifiers, General, in this Section.
 - c. Power Output Per Channel, continuous average sine wave power into 70 Volt line impedance, not less than.
 - i. PA50-70, 50 Watts
 - ii. PA100-70, 100 Watts
 - iii. PA200-70, 200 Watts
 - iv. PA300-70, 300 Watts
 - v. PA800-70, 800 Watts
 - d. Dimensions: Not to exceed 3 rack units for 2 channels.
 - i. Manufacturer, PA50-70
 - a) Stewart CVA-50-1
 - b) Crown
 - c) QSC
 - d) Peavey
 - e) Or equal
 - ii. Manufacturer, PA100-70

- a) Crown CH-1
- b) QSC
- c) Peavey
- d) Or equal
- iii. Manufacturer, PA200-70
 - a) Crown CH-1
 - b) QSC
 - c) Peavey
 - d) Or equal
- iv. Manufacturer, PA300-70
 - a) Crown CH-1
 - b) QSC
 - c) Peavey
 - d) Or equal
- v. Manufacturer, PA800-70
 - a) Crown CH-1
 - b) QSC
 - c) Peavey
 - d) Or equal

C. MISCELLANEOUS DEVICES

- 1. Thermostat
 - a. Supply Crestron Thermostat compatible with Town's existing Mechanical system, e.g. CHV-THSATW Coordinate with Town Representative prior to Product Submittal.
 - b. Provide programming of AV Crestron Control System to allow monitoring and manual control of Thermostat setting via the AV touch screens.

D. ASSISTIVE LISTENING SYSTEM (ALS):

- 1. General
 - a. Provide Radio Frequency Type, Frequency Modulated
 - b. 72 MHz Assistive Listening band.
 - c. Quantity of Devices:
- 2. ALS Transmitter
 - a. Drawing Symbol: ALS TX
 - b. Features
 - i. Balanced bridging line input.
 - ii. Rack mounted.
 - iii. Connector for remote-mounted antenna.
 - iv. Selectable transmitting frequency.
 - c. Manufacturer

- i. Listen Technologies LT-800-072 Stationary Transmitter with LA-326 Rack Mounting Kit
 - ii. Phonic Ear
 - iii. Williams Sound Corp
 - iv. Or equal.
- 3. ALS Remote Transmitting Antenna
 - a. Drawing Symbol: A
 - b. Features
 - i. Antenna system with mounting hardware, matching specified ALS TX.
 - c. Manufacturer
 - i. Listen Technologies LA-123
 - ii. Phonic Ear
 - iii. Williams Sound Corp
 - iv. Or equal.
- 4. Receivers and Accessories
 - a. Receiver
 - i. Battery powered, rechargeable.
 - ii. Volume control.
 - iii. Receptacle for earphone/accessory.
 - iv. Rechargeable battery.
 - v. Tuneable to channel in use by the user.
 - vi. Quantity: As Scheduled on the plans
 - b. Earphone
 - i. Ear hung, not inserted in the ear canal.
 - ii. Hearing-Aid Compatible - For hearing-aid compatible receivers:
 - iii. Wireless neck loop compatible with "T" coil hearing aids.
 - iv. Built-in antenna
 - v. Operates with provided receivers
 - c. Manufacturer
 - i. Listen Technologies LR-500-072-0-M-C, LA-164 earphones, and LA-166 neck loops
 - ii. Phonic Ear
 - iii. Williams Sound Corp
 - iv. Or equal.
- 5. Battery Charger/Storage/Carry Case
 - a. Features
 - i. Store and charge up to 16 Receivers and related accessories.
 - ii. Cover, latches and carrying handles.
 - iii. Removable lid.

- b. Quantity: To simultaneously recharge each received as scheduled on the plans
 - i. Manufacturer
 - ii. Listen Technologies LA-325
 - iii. Phonic Ear
 - iv. Williams Sound Corp
 - v. Or equal..

E. AUDIO SIGNAL SOURCE AND STORAGE:

- 1. Microphone, Wired Gooseneck, Desk, with Switch
 - a. Drawings Reference: Keynote call-out, GMIC
 - b. Function/Features/Performance
 - i. Gooseneck integrated microphone with desktop base with integrated programmable switch and indicator.
 - ii. Element: Cardioid condenser.
 - iii. Frequency response: +/- 3 dB, 80 Hz to 15,000 Hz
 - iv. Output impedance 200 Ohms or less.
 - v. Total harmonic distortion: Less than 3% at 110 dB SPL.
 - vi. Output level (Open circuit Voltage at 1,000 Hz): at least -78.0 dB (0dB= 1 V/microbar).
 - vii. Maximum SPL: 120 dB.
 - viii. Signal to noise ratio: 65 dB at 1 kHz at 94 dB SPL.
 - ix. Power: Phantom (Simplex) 12 to 48 VDC operating range.
 - x. Windscreen: Foam or metal and foam.
 - xi. Gooseneck: Flexible, miniature. Stiff center section, flexible both ends.
 - xii. LED indicator: On when microphone is on.
 - xiii. Connector: 5 pin circular audio connector, male, on 10 foot cable.
 - xiv. Finish: Flat black.
 - xv. Length: Approximately 18 inches overall
 - xvi. Base: Weighted desktop base.
 - xvii. Switch: Membrane switch, programmable function. Configure for push on/push off function.
 - c. Manufacturer
 - i. Shure MX418D/C and accessory mic cable (black).
 - ii. AudioTechnica ES915C18 Gooseneck Microphone and accessory mic cable (black).
 - iii. Or equal.
- 2. Wireless Presentation System
 - a. Drawing Symbol: AIRMEDIA
 - b. Functions/Features:
 - i. Wireless presentation for up to 40 user-supplied wifi devices over captive wireless network

- ii. Moderator Preview/Authorization Function
 - iii. Auto-renewable IP Address for access
 - c. Manufacturer:
 - i. Crestron AirMedia
 - ii. No known equal..
- 3. Digital Signal Processing (DSP) System
 - a. Drawing Symbol(s): DSP
 - b. Function/Features:
 - i. Implement functions shown on Drawings using Digital Signal Processing (DSP) hardware and software.
 - ii. System implements in software at least the following functions as indicated on the plans:
 - a) AMIX - automatic microphone mixer - MIC and LINE INPUTS as indicated
 - b) REMOTE - Remote power on/off, gain control, auxiliary mixer select, System Mode - controlled through interface to Control System specified elsewhere in this Section.
 - c) DELAY - multi-channel delay, output quantity as indicated with 0-100 ms delay assignable to each output on selection of delay mode operation.
 - d) LEVEL - Gain control under control of REMOTE
 - e) X02WAY 24dB - Crossover network, 2 port, 24 dB/octave
 - f) HP - High Pass Filter
 - g) LIM - Limiter
 - h) SHELF - Shelving Filter
 - i) FBX - Automatic Feedback Suppressor
 - j) PEQ* - Parametric Equalizer, where * indicates bands provided
 - k) MIX* - Mixer, where * indicates channel count
 - l) LP - Low pass filter
 - iii. Field reconfigurable functions and parameters.
 - iv. Performance:
 - a) Sample at 48 kHz or greater.
 - b) At least 20 bit input/output quantization.
 - c) Noise performance within 3 dB of theoretical limit.
 - d) Minimum of 24 bit internal processing.
 - e) Provide control with true status feedback.
 - v. Priority volume attenuator implemented as indicated on the drawings/specification narrative.
 - c. Manufacturer - DSP System
 - i. Biamp Systems AudiaFLEX configured with Audia IP2 input boards, Audia OP2 output boards and AudiaEXPO output expander as required.
 - ii. Peavey Electronics MediaMatrix

- iii. BSS Soundweb Series
 - iv. Symetrix SymNet Series
 - v. Or equal.
4. Radio Frequency Receiver/Wireless Microphone System:
- a. Drawing Reference(s):
 - i. WMRX
 - ii. WMIC, WMIC LAV - Wireless Mic, Lavalier
 - iii. WGMIC – Wireless Mic, Gooseneck
 - iv. Wireless microphone symbol.
 - b. Provide quantity of complete systems to match quantity of WMIC microphone symbols shown.
 - i. Coordinate operating frequency with other UHF local sources, including but not limited to current television operating frequencies and DTV frequency allocations and/or local public safety operating frequencies to eliminate any interference from outside RF sources.
 - ii. Provide Receiver unit configured for diversity reception.
 - iii. Allows the expansion of wireless microphone systems by splitting one pair of antennas to multiple receivers. It also amplifies RF signals to compensate for insertion loss that results from splitting signal power to multiple outputs. A single system can support up to four wireless receivers.
 - c. Function/Features/Performance:
 - i. WMRX/WMIC/WGMIC
 - a) Operating Range Under Typical Conditions: 100m (300 ft.) Note: actual range depends on RF signal absorption, reflection, and interference.
 - b) Audio Frequency Response (+/- 2 dB): Minimum: 45 Hz; Maximum: 15 kHz
 - c) Total Harmonic Distortion (ref. +/- 38 kHz deviation, 1 kHz tone): 0.5%, typical
 - d) Dynamic Range: >100 dB A-weighted
 - e) Operating Temperature Range: -18°C (0°F) to +57°C (+135°F)
Note: battery characteristics may limit this range
 - f) Transmitter Audio Polarity: Positive pressure on microphone diaphragm (or positive voltage applied to tip of WA302 phone plug) produces positive voltage on pin 2 (with respect to pin 3 of low impedance output) and the tip of the high impedance 1/4-inch output.
 - d. Manufacturer, WMIC System:
 - i. Shure:
 - a) Handheld: Shure ULXD2 Wireless Handheld Transmitter
 - b) Lapel: Shure WL185, P3RA Bodypack, SE215 Earphones
 - c) Gooseneck: ULXD8

d) SBC450 Networked Charging Station for ULXD8, w/
SBC200US/SBC200 expanders, SB900A as required.

ii. Sennheiser

iii. Or Equal.

F. CONTROL SYSTEM AND RELATED

1. General

a. Products provide under this Section shall be made by manufacturers regularly engaged in the production of programmable commercial audio-visual control systems. Such manufacturers shall have at least 5 years prior production experience in the manufacture of such goods.

b. Provide control system to perform functions scheduled on drawings and herein.

i. System to be field programmable.

ii. Provide programming allowance to implement system as defined in Part 1 and as modified by Town prior to first use. Provide an additional \$2,000 to implement system operation enhancements determined by Town following first use.

2. Control Processor

a. Drawing Reference: CONTROL

b. Features/Functions/Performance:

i. Control System shall utilize a processor at no less that of sufficient capability to provide the indicated control functions without degradation due to system overload.

ii. I/O Ports:

a) At least 3 RS-232/422/485 Ports.

b) At least 8 IR/Serial Ports.

c) At least 8 Isolated Relay Ports

d) At least 8 I/O Ports.

e) At least 1 Port for the control system manufacturer's proprietary A/V network.

f) At least 1 TCP/IP Ethernet Network connection via an RJ-45 connector.

iii. Control System shall be fully compatible with the control system manufacturer's projector and A/V equipment status monitoring and management software.

iv. Control System shall include a 10/100 BaseT Ethernet Port that supports all of the following features:

a) TCP/IP Communications

b) DHCP and DNS Support

c) IEEE 802.11b and Bluetooth Compatibility

d) Native Email Client

e) Remote Diagnostics

f) Remote Program Loading and Administration

g) Built-In Web Server

- h) FAT32 File System for easy data management
- i) SSL security plug-in
- j) PDA Integration and Control, XPanel PDA - Pocket PC 2002
- k) WebTablet Integration and Control – Microsoft Tablet PC
- l) Self Generating Executable GUI, XPanel EXE – Microsoft Family of Operating Systems
- m) Self Generating ActiveX powered Microsoft Internet Explorer Integration and Control, XPanel Microsoft Internet Explorer.
- n) Self Generating Java powered Web Integration and Control
- v. Control System Processor shall utilize a real time, event driven, multitasking, multi-threaded operating system with a dual bus architecture.
- vi. High speed processor shall communicate directly with Ethernet, control ports and proprietary control network utilizing high-speed, parallel bus infrastructure. Control processors that communicate via a serial bus shall not be accepted.
- vii. Control processor shall contain sufficient memory for the applications indicated.
- viii. Control System processor shall utilize a FAT32 file structure.
- ix. Control System shall support internal communications speed via two, independent communications busses. First control bus speed shall be at least 40 mb/s, second control bus speed shall be at least 300 mb/s.
- x. Full API (Applications Interface) directly to control system via TCP/IP for integration with Visual Basic, C++, Java, etc. applications. API support through included control system manufacturer's ActiveX modules and/or their Dynamic Link Library (.DLL) file.

Control system manufacturer's to continuously monitor the integrity of the A/V control network for wiring faults, marginal communication performance, network errors – all information is viewable.

- xi. System Support RS-485 token passing network with data communication for a minimum distance of 5000 feet.
- xii. Allow proprietary A/V Network network expansion via Ethernet or RS-232 ports, which can allow for high-speed network acceleration.
- xiii. Support a minimum of 253 proprietary network devices simultaneously.
- xiv. Control system shall support object-oriented logic based programming language and a C-like language programming language. Both programming types are supported to run simultaneously and integral to each other.
- xv. Control system manufacture shall supply Windows-based graphical programming software for drag and drop object oriented programming for the control system operation.
- xvi. Control system manufacture shall provide Windows-based graphical programming software, which is self-documenting in that it generates a symbolic flow diagram printout from the system program.
- xvii. The control system shall support a variety of wireless communication modes, including one-way and two-way radio frequency and infrared transmission.

- c. Manufacturers:
 - i. Crestron CP3 w/ power supply as required to remotely power connected control and transmit/receive devices as shown on drawings.
 - ii. Extron
 - iii. or equal.
- 3. Control Distribution
 - a. Drawing Reference: CTRL BUS EXPAN, CBLOCK
 - b. Features/Functions
 - i. Distribution block for up to (8) terminations of control cabling.
 - ii. Power isolation
 - iii. LEDs to indicate presence of power and data.
 - iv. Surface mountable.
 - c. Manufacturers
 - i. Crestron CNTBLOCK
 - ii. Extron
- 4. 24-Port PoE Network Switch
 - a. Drawing References: NSW
 - b. Port Count:
 - i. 24
 - c. Construction.
 - i. 1 Rack Unit maximum
 - ii. Provide accessories as required to rack mount.
 - d. Manufacturers:
 - i. Cisco Catalyst WS-C2960S-24PS-L.
 - ii. DLink
 - iii. Hewlett Packard
 - iv. or equal.
- 5. Control Panel, Touch, Top-Set/Wall-Mount
 - a. Drawing Reference: CTP (Topset), CTW (Wall-Mount)
 - b. Features/Performance:
 - i. Programmable for customized control
 - ii. Touchscreen Display
 - a) 10" diagonal TFT active matrix color LCD
 - b) 1280 x 800 minimum resolution
 - c) 400 cd/m2 minimum brightness, LED lit
 - d) 24-bit, 16.7M colors
 - e) Viewing angle: +/- 80 degrees horizontal and vertical
 - iii. Memory
 - a) 1 GB RAM

- b) 4 GB Flash
- iv. Ethernet: 10/100 Mbps
- v. Power: POE
- c. Manufacturers
 - i. Crestron TSW-1060 w/ Topset/Wallmount Accessory Kit
 - ii. Extron
 - iii. Or equal.

6. Switcher, High Definition Video and MultiMedia 16x16

a. Drawing Reference: AVSW

b. Minimum Features/Functions/Performance:

i. Video

a) Switcher: 16x16 combination digital/analog switch, resolution management,

b) Input Signal Types:

(1) High Definition, Multi-format Media (HCAT) over twisted-pair copper wire),

(2) HDMI, DVI*, DisplayPort Multimode*, RGB, component (YPbPr), S-Video (Y/C), composite

c) Output Signal Types: HCAT, HDMI,

d) Formats: HDMI v.1.3a, DVI v.1.0, HDCP v.1.2 content protection support, RGBHV up to UXGA/WUXGA, HDTV up to 1080p60, NTSC or PAL

e) Input Resolutions, HDMI up to 2048x1152@60Hz, plus any other resolution allowed by HDMI v.1.3a up to 165MHz pixel clock

f) Input Resolutions, RGB up to 2048x1152@60Hz.

g) Input Resolutions, Component up to 1080p60

h) Input Resolutions, Composite and S-Video: 480i, 576i

i) Output Resolutions: Matched to inputs

j) Analog-To-Digital Conversion: 10-bit 165 MHz per each of 3 channels

ii. Audio

a) Switcher: Combination digital/analog switch, limited audio breakaway;

b) Inputs: H CAT, HDMI, S/PDIF coaxial, analog stereo

c) Independent input compensation and master volume adjustment for analog

d) Output Signal Types: HCAT, HDMI v.1.3a, analog stereo

e) Formats, HDMI only: Up to 8ch PCM Formats, HDMI and SPDIF: Dolby Digital AC3 5.1, Dolby Digital EX 5.1, DTS 5.1, DTS-ES Matrix 5.1, DTS-ES Discrete 6.1, DTS 96/24 5.1, 2ch PCM Formats, Analog: Stereo 2-Channel

f) Analog-To-Digital Conversion: 24-bit 48 kHz

g) Digital-To-Analog Conversion: 24-bit 48 kHz

h) Volume Gain Range (analog out): -80dB to 0dB, 1 dB steps

i) Input Compensation (analog out): ±10dB

j) Performance (analog): Frequency Response: 20Hz to 20kHz \pm 0.75dB;

k) S/N Ratio: >90dB, 20Hz to 20kHz A-weighted;

l) THD+N: <0.05% @ 1kHz;

m) Stereo Separation: >90dB

iii. Ethernet

a) General: 10BaseT/100BaseTX, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, IEEE 803.U compliant

b) Switch: (1) 10BaseT/100BaseTX Ethernet port (rear panel); (4)

c) 10BaseT/100BaseTX Ethernet ports (actual hardware ports are exposed on select outboard devices)

iv. USB

a) Protocols: Supports USB HID class devices

v. Connectors

a) Provide input and outputs cards as required to accommodate the functionality as shown on the drawings.

vi. Minimum Environmental Performance Range:

a) Temperature: 32° to 104°F (0° to 40°C)

b) Humidity: 10% to 90% RH (non-condensing)

c. Manufacturers:

i. Crestron DM-MD16x16 w/ I/O cards as required

ii. Extron

iii. or equal.

7. High Definition A/V Transmitter

a. Drawing Reference: DMTX

b. Functions/Features:

i. Provides HDMI, RGBHV and mini stereo audio inputs

ii. Provides USB extension

iii. Provides LAN connectivity

iv. Transmits audio, video and control signaling to specified receiver over a single UTP6-4P cable.

v. HDCP compatible.

vi. Can be remotely powered by specified control system.

vii. Mounts to underside of table.

viii. Nominal dimensions: 6.5" x 7" x 1.5"

c. Manufacturer

i. Crestron DM-TX-201-C

ii. Or equal.

8. HD-SDI and Balanced Analog Audio Output Plate

a. Drawing Reference: MP2

b. Features/Functions

- i. Outputs
 - a) HD-SDI Coax
 - b) Balanced Audio XLR 3-pin
 - c. Manufacturer:
 - i. ProCo
 - ii. Or equal.
- 9. HDMI and RGBHV w/ Stereo Audio Input Plate
 - a. Drawing Reference: MP1
 - b. Features/Functions
 - i. Inputs
 - a) HDMI
 - b) RGBHV
 - c) Stereo Audio
 - d) USB
 - ii. 2x1 combination digital/analog switch
 - iii. Supports resolutions up to 2048x1080 @ 24Hz
 - iv. Analog-To-Digital Conversion 10-bit 165 MHz per each of 3 channels
 - v. Communications
 - a) Audio, video and control 330 feet over a single UTP Cat 6 cable.
 - b) HDCP management, EDID format management, CEC
 - vi. USB Supports USB HID class devices
 - vii. Compatible with specified switcher.
 - viii. Remotely powered from switcher/headend equipment location.
 - ix. 2 gang.
 - c. Manufacturers
 - i. Crestron DM-TX-200-C-2G w/ required remote power accessories.
 - ii. Extron
 - iii. Or equal.
- 10. Multimedia Receiver w/ Scaler
 - a. Drawing Reference: DMRX
 - b. Features/Functions
 - i. Receives audio, video and control over a single UTP Cat 6 cable.
 - ii. Outputs
 - a) HDMI, DVI
 - b) RS-232
 - c) IR
 - d) USB
 - e) LAN
 - iii. Communications: HDCP management, EDID format management, CEC

- iv. Supports resolutions up to 2048x1080 @ 24Hz
- v. Compatible with specified switcher.
- vi. Enclosure
 - a) Metal, black finish, vented sides and front
 - b) 8" x 8" x 2"
- vii. Built-in video scaler: HD video scaler, motion-adaptive deinterlacer, interlacer, intelligent frame rate conversion, Deep Color support, 3D to 2D conversion, content-adaptive noise reduction
- c. Manufacturers
 - i. Crestron DM-RMC-SCALER-C
 - ii. Or equal.

G. VIDEO EQUIPMENT AND RELATED

1. Projection Screen, Ceiling (motorized)/Wall Mount (fixed), Tab Tensioned, 16:10 Format
 - a. Drawing Reference(s): SCR, SCREEN
 - b. Size: As indicated on drawings.
 - c. Features/Functions:
 - i. 16:10 aspect ratio.
 - ii. Seamless viewing area.
 - iii. Electrical (motorized only): 120 volts, single phase, 60 hertz.
 - iv. Fabric: Flame and mildew resistant surface with black masking borders and black drop above the viewing surface.
 - v. Finish
 - a) High contrast grey finish suitable for use with high output LCD or DLP projection.
 - vi. Extra drop provide to drop screen within 4' above finished floor (Chamber side) and 6' above finished floor (Chamber front wall), unless otherwise indicated on the drawings.
 - vii. Motorized operation with automatic travel stops.
 - viii. Motor and roller: Reversible motor with permanent seal ball bearings, automatic thermal overload cut-out. Stressed truss roller minimum 5 inches (127 mm) diameter, mounted on steel brackets with heavy duty bearings.
 - ix. Cable tensioning system at edges to ensure flatness.
 - x. UL listed.
 - xi. Flat black edge finish.
 - xii. Size: Motorized (side) Viewable Screen Height and Width 128" x 80", bottom of screen at +48" a.f.f. Fixed (front wall) Viewable Screen Height and Width: 134" x 83.75", bottom of screen at +60" af.f. Contractor shall confirm screen fit between finish ceiling an unobstructed projection beam path below existing pendant light fixtures prior to submittal.
 - a) Housing recessed in ceiling. Housing can be delivered to site and rough-in prior to placement of screen to protect screen from damage.
 - xiii. Provision screen with all necessary screen manufacturer options to use indicated low voltage, closure operation. Receipt of serial control or contact closure from Audio-visual control system shall be sufficient to unroll screen for viewing, re-roll screen or to stop screen at intermediate point. Field adjustable down limit switch shall automatically stop screen in full down position.
 - d. Performance:

- i. 0.9 gain on-axis gain. \pm .2.
 - e. Manufacturers
 - a) Draper Access Series V with Hi Def screen.
 - b) Vutech Prelude II with grey high definition, high contrast screen.
 - c) Stewart Filmscreen
 - d) Or equal
- 2. Document Camera, Table Top
 - a. Drawing Reference: DOC CAM
 - b. Manufacturer:
 - i. VZ 3neo Visualizer System
 - ii. Or equal.
- 3. Document Camera, Overhead
 - a. Drawing Reference: DOC CAM
 - b. Manufacturer:
 - i. EYE-14 Camera System
 - ii. Or equal.
- 4. HDMI Distribution Amplifier
 - a. Drawing Reference: HDDA-6
 - i. Up to 4096x2160 at 60Hz 4:2:0, 8-bit
 - ii. HDMI 2.2, HDCP 1.4 compliant
 - iii. 10.2 Gbps
 - iv. RS-232 Serial Control
 - v. 1 HDMI Input, 6 HDMI Output
 - b. Manufacturer:
 - i. Extron DA6 HD 4k
 - ii. Kramer
 - iii. Or equal.
- 5. Video Projectors, HD
 - a. Drawing Reference: VPROJ
 - i. Capable of accepting variety of focal length bayonet-style lenses
 - ii. Minimum features, functions and performance:
 - a) Resolution
 - (1) Native: WUXGA 1920 x 1200
 - (2) Maximum: WUXGA 1920 x 1200
 - b) Light Output: 7500 lumens
 - c) Contrast Ratio: 2000:1
 - d) Lamp Life: (up to) 2000 hours normal / 2500 hours eco
 - e) Lens Shift: Manual: 50% vertical, 10% horizontal
 - f) Keystone Correction: +/- 40 degrees horizontal, +/- 30 degrees vertical
 - g) Scan Rate
 - (1) Horizontal: 15 - 108 kHz
 - (2) Vertical: 48 - 120 Hz
 - h) Supported Video Standards: NTSC, NTSC4.43, PAL, PAL-60, PAL-M, PAL-N, SECAM SD/HD
 - i) Video Signal Compatibility: 1080i, 720p, 576p, 576i, 480p, 480i
 - j) PC Signal Compatibility: VGA, SVGA, XGA, SXGA, SXGA+, UXGA
 - k) Macintosh Compatibility: Yes
 - l) Input/Output Terminals:
 - (1) HDMI w/ HDCP.
 - (2) External Control: IP
 - m) Sync Compatibility: Separate Sync / Composite Sync / Sync on G
 - n) Networking: Wired LAN using integrated RJ45

- o) Electrical
 - (1) Power Consumption: Not greater than 550W at 120VAC input
 - p) Mechanical
 - (1) Installation Orientation: Ceiling/Front
 - q) Max. Dimensions (WxDxH):20 x 20 x 8 in.
 - r) Max. Weight: 50 lbs.
 - s) Max. Fan Noise: 40 dB normal / 31 dB eco at 3' from projector.
 - t) UL Listed
 - u) Environmental
 - (1) Operational Temp.: 41° - 104°F / 5° - 40°C
 - (2) Humidity: 20-80% non-condensing
- b. Manufacturers, Projectors:
- i. Panasonic PT-RZ970 with 085FL Lens
 - ii. Christie
 - iii. or equal.

6. Rack-mounted Network-accessible Solid-State HD Video Recorder

- a. Drawing Reference: NVR
- b. Features/Functions/Performance:
 - i. Video Input: 1080i 25, 29.97, 30, 1080PsF 23.98, 24, 25*, 29.97*, 1080p 23.98, 24, 25, 29.97, 720p 23.98*, 25*, 29.97*, 50, 59.94, 60, 625i 25, 525i 29.97.
 - ii. Codec Support: Apple ProRes 422, Apple ProRes 422 (HQ), Apple ProRes 422 (LT), Apple ProRes 422 (Proxy), Avid DNxHD HQX (220x), Avid DNxHD SQ (145), Avid DNxHD LD (36) only provides support for the 1080p format.
 - iii. Removable Storage: 2-slots w/ rollover recording.
 - iv. Video Input Digital: SD/HD SDI, SMPTE-259/292/296, 10-bit, Single Link 4:2:2 (2 x BNC, input selection in software), HDMI v1.3
 - v. Video Output Digital: SD/HD SDI, SMPTE-259/292/296, 10-bit, Single Link 4:2:2 (1 x BNC), HDMI v1.3
 - vi. Audio Input Digital: 8-Channel, 24-bit SMPTE-272/299 SDI embedded audio, 48 kHz sample rate, synchronous; 8-Channel, 24-bit HDMI embedded audio, 48 kHz sample rate, synchronous; 8-Channel, 24-bit AES/EBU audio, 48 kHz sample rate, synchronous or nonsynchronous, internal sample rate conversion (4 x BNC)
 - vii. Audio Input Analog: 2-Channel, 24-bit A/D analog audio, 48 kHz sample rate, balanced (2 x XLR); +24 dBu full scale digital; +/- 0.2 dB 20Hz to 20 kHz frequency response (Note: Line or Mic selection via CONFIG menu parameters)
 - viii. Audio Output Digital: 8-Channel, 24-bit SMPTE-272/299 SDI embedded audio, 48 kHz sample rate, synchronous; 8-Channel, 24-bit HDMI embedded audio, 48 kHz sample rate, synchronous; 8-Channel, 24-bit AES/EBU audio, synchronous or nonsynchronous, internal sample rate conversion (4 x BNC)
 - ix. Audio Output Analog: 2-Channel, 24-bit D/A analog audio, 48 kHz sample rate, balanced (2 x XLR); +24 dBu full scale digital (0dbFS); +/- 0.2 dB 20 Hz to 20 kHz frequency response; Stereo unbalanced headphone (1 x 3.5mm mini jack)
 - x. Timecode: SDI RP188/SMPTE 12M via SDI BNC; HDMI (when used with compatible cameras); LTC Input (1 x BNC); LTC output (1 x BNC) (Note: active during playback not during record or EE)

- xi. RS-422 Machine Control
 - xii. 1 RU
 - c. Manufacturer:
 - i. Aja Ki Pro Rack
 - ii. Or equal.
- 7. Document Camera, HD
 - a. Drawing Reference: DOC CAM
 - b. Features/Functions:
 - i. Camera: CMOS
 - ii. Imaging: 2D
 - iii. Horizontal Resolution: 980
 - iv. Frames Per Second: 30
 - v. Sensor: 1920x1080
 - vi. Lens Type: Wide
 - vii. Optical Zoom: 14x
 - viii. Digital Zoom: 2x
 - ix. Camera Rotation: 100/120-degrees
 - x. Output: HDMI
 - c. Manufacturer:
 - i. WolfVision VZ-8light
 - ii. Or equal
- 8. HD Pan-Tilt-Zoom Camera
 - a. Drawing Reference: PTZ, CC, CCAM
 - b. Features/Functions/Performance:
 - i. Image Device: 1/2.8 inch type Exmor CMOS
 - ii. Effective Pixels: Approx. 2.1 megapixels
 - iii. Lens: 30x Optical/12x Digital Zoom Lens
 - iv. Focal Length f=4.3mm (wide) to 129mm (tele) / Focal Length F: F1.6 to 4.7
 - v. Minimum Object Distance 10mm (wide end) to 1200mm (tele end)
 - vi. Auto Exposure: Auto, Manual, Priority, AE (shutter, iris), Exposure Compensation, Bright
 - vii. Shutter Speed: 1/1 to 1/10000 sec (59.94 Hz system), 1/1 to 1/10000 sec (50 Hz system)
 - viii. Gain: Auto/Manual (0 to +43 db)
 - ix. White Balance: Auto, Indoor, Outdoor, One-push auto, ATW, Manual
 - x. Pan Angle/Speed: Angle: +/- 170 degrees / Speed: 60 degrees/sec
 - xi. Tilt Angle/Speed: Angle: +/- 90 degrees to -30 degrees/ Speed: 60 degrees/sec
 - xii. Horizontal Viewing Angle: 65 degrees (wide)
 - xiii. Preset Positions: 256 - Positions 17 to 256 are stored as PTZ only

- xiv. Digital Zoom: 12x digital
 - xv. Focus System: Auto/Manual
 - xvi. Sync System: INT
 - xvii. Wide Dynamic Range: Yes (View-DR Technology)
 - xviii. Camera Control Interface: VISCA protocol with built-in IP control RS-422 Serial Interface (RJ-45)
 - xix. Horizontal Resolution: 1080/59.94p / 50p / 1080/59.94i (50i) / 720/59.94p (50p)
 - xx. Minimum Illumination: 1.4 lx (50 IRE, F1.6, 30 fps)
 - xxi. S/N Ratio: 50 dB
 - xxii. Video Output: 3G-SDI / HDMI
 - xxiii. IP Streaming (RTSP)
 - xxiv. Audio Embedded: Yes 3G-SDI, HDMI, and IP
 - xxv. Audio Input: MIC/Line x2 (selectable)
 - xxvi. Signal System 1080/59.94p (A/B) / 50p (A/B) / 1080/59.94i (50i) / 720/59.94p (50p)
 - xxvii. Dimensions (W x H x D): 6-3/8 x 7-1/2 x 8 inches (159 x 187.5 x 200.5 mm)
 - xxviii. Weight Approx. 4 lb. 10 oz. (2.1kg)
 - xxix. Power Requirements: PoE+
 - xxx. DC 12V (DC10.8V to 13.2V)
 - xxxi. Power Consumption: PoE+ Max 30 W
 - xxxii. Operating Temperature: 32° to 104°F / 0° C to 40°C
 - xxxiii. Storage Temperature: -4°F to 140°F / -20°C to +60°C Or equal.
- c. Manufacturer:
- i. Sony SRG360SHE
 - ii. Panasonic
 - iii. Or equal.

H. SOUND CABLES AND RELATED

1. General
 - a. Provide cable with electrical conductors of soft drawn annealed copper, bare or tinned, solid or concentric stranded as applies, conductivity not less than 98 percent of pure copper.
 - b. Comply with applicable Code for insulation, jacket, marking and listing for applicable use.
 - i. Refer to California Electrical Code, Table 725-61. Cable Uses and Permitted Substitutions.
 - c. Manufacturer part number specified is for a Listed Type CM construction to indicate intended cable construction and quality.
 - i. Code requirements take precedence.
 - ii. Provide type required by Code at no additional cost to the Town.
2. Cable, Microphone and Line Level, General Purpose

- a. Drawing Symbol(s): SP, 2A.
 - b. Description: Shielded, single twisted pair, with #20 AWG color coded stranded conductors and foil shield with drain wire.
 - c. Performance/Construction
 - i. Conductors AWG #20.
 - ii. Conductors Stranding: 7 by 28.
 - iii. D.C. Resistance Per 1000 feet: 15 ohms maximum.
 - iv. Shield: Aluminum polyester foil with #20 AWG stranded tinned copper drain wire.
 - v. Diameter 0.24 inch maximum.
 - d. Where 2A indicated, provide 2 each SP
 - e. Manufacturer
 - i. Belden 8762
 - ii. West Penn.
 - iii. Or equal.
3. Cable, Microphone and Line Level, Miniature
- a. Drawing Symbol: SP, 2A
 - b. Restriction: For use within fixed equipment racks only.
 - c. Description: Shielded, single twisted pair, with #22 AWG color coded stranded conductors and foil shield with drain wire.
 - d. Performance/Construction:
 - i. Conductors AWG #22.
 - ii. Conductors Stranding: 7 by 30.
 - iii. D.C. Resistance Per 1000 feet: 20 ohms maximum.
 - iv. Shield: Aluminum polyester foil with #24 stranded tinned copper drain wire.
 - v. Diameter 0.15 inch maximum.
 - e. Where 2A indicated, provide 2 each SP
 - f. Manufacturer
 - i. Belden 8451, 9451, 1266A.
 - ii. Alpha.
 - iii. West Penn.
 - iv. Or equal.
4. Cable, Antenna, Assistive Listening System and Wireless Microphone System
- a. Description
 - i. Nominal 50 ohms (actual 51 or 52 ohms) coaxial cable.
 - b. Minimum 97 percent shield coverage.
 - c. Joint Army Navy (JAN) or Military (MIL) Construction
 - i. RG-8/U to JAN-C-17A
 - ii. RG-8 A/U to MIL-C-17D
 - iii. RG-9/U to JAN-C-17A.

- d. Manufacturer
 - i. Belden 8237, 9251 or 8242.
 - ii. CommScope.
 - iii. Or equal.
- 5. Cable, Loudspeaker and D.C. Power
 - a. Drawing Symbol(s)
 - i. #18TP
 - ii. #16TP
 - iii. #14TP
 - iv. #12TP
 - b. Description
 - i. Twisted pair, jacketed, unshielded cables, #12, #14, #16, or #18, as shown on Drawings.
 - c. Plenum rated where installed in open plenum return voids.
 - d. Performance/Construction
 - i. Conductor, AWG: #12, #14, #16, and #18, as noted.
 - ii. Maximum diameter
 - a) 0.384 inch (#12)
 - b) 0.332 inch (#14)
 - c) 0.256 inch (#16)
 - d) 0.224 inch (#18).
 - e. Manufacturer
 - i. Belden.
 - a) #12TP, Belden 8477
 - b) #14TP, Belden 8473
 - c) #16TP, Belden 8471
 - d) #18TP, Belden 9740
 - e) West Penn.
 - f) Or equal.

I. VIDEO CABLES, COPPER COAX AND RELATED

- 1. General
 - a. Provide cable with electrical conductors of soft drawn annealed copper, bare or tinned, solid or concentric stranded as applies, conductivity not less than 98 percent of pure copper.
 - b. Comply with applicable Code for insulation, jacket, marking and listing for applicable use.
 - i. Refer to California Electrical Code, Table 725-61. Cable Uses and Permitted Substitutions.
 - ii. Manufacturer part number specified is for a Listed Type CM construction to indicate intended cable construction and quality.
 - c. Code requirements take precedence.

- i. Provide type required by Code at no additional cost to the Town.
- 2. Cable, Data Monitor Precision Video
 - a. Plan Reference(s):
 - i. D5
 - ii. 5DVideo
 - b. Construction
 - i. 5 miniature high resolution coax cables in an overall shielded overall jacket to transmit analog component video based on the Red-Green-Blue-Horizontal Sync-Vertical Sync (RGBHV) transmission method.
 - ii. Sub cables are color coded Red, Green, Blue, Black, Grey; or approved alternate color coding scheme.
 - iii. Jacket: Code approved equal for application.
 - iv. Overall five sub cable assembly diameter: 0.56" maximum in raceway applications.
 - v. Center Conductor AWG: Twenty two (22) ga Silver Plated Copper.
 - vi. Insulation: Foamed Teflon.
 - vii. Shield:
 - a) Each sub-cable is double shielded
 - b) Overall cable has 100% tape shield.
 - c. Approval/Rating:
 - i. UL: Recognized Type CL2P (Article 725 of NEC) for plenum application, riser rated elsewhere.
 - d. Performance - each sub-cable:
 - i. Resistance: 0.0162 ohms/ft nominal @ 20C
 - ii. Impedance: 75 ohm nominal
 - iii. Capacitance: 17.5 pf/ft nominal
 - iv. Velocity of Propagation: 80% nominal
 - v. Time Delay: 1.19ns/ft nominal
 - vi. Maximum Attenuation Per 100':
 - a) 10 MHz: 0.8 dB/100 ft.
 - b) 50 MHz: 2.5 dB/100 ft.
 - c) 100 MHz: 3.5 dB/100 ft.
 - d) 200 MHz: 4.6 dB/100 ft.
 - e) 300 MHz: 5.0 dB/100 ft.
 - f) 400 MHz: 7.2 dB/100 ft.
 - g) 1000 MHz: 14.6 dB/100 ft.
 - e. Manufacturers:
 - i. Altinex CB5100PL in plenum spaces, riser rated elsewhere.
 - ii. Extron
 - iii. Belden
 - iv. Gepco.

v. or equal.

3. HDMI/DVI Cabling

a. Drawing Reference: DVI/HDMI

b. Features/Functions

i. The plans indicate the required distances for HDMI format transmission. Contractor to provide a transmission system appropriate to the indicated lengths. Contractor engineered solutions may consist of:

a) Passive HDMI cabling, where the indicated length is within the service distance of such systems.

b) Copper HDMI cabling and active HDMI repeaters

c) Fiber Optic Cabling and HDMI transceivers.

ii. Contractor to select and provide the method of transmission appropriate to the length and operating parameters of the selected transmission system as defined by the manufacturers of the cabling systems, the repeaters and/or transceivers and the HDMI transmission standard as defined at www.hdmi.com.

c. Manufacturers, copper cabling and extenders:

i. Extron

ii. Broaddata

iii. Altinex

iv. Liberty Cable

v. or equal.

J. CONTROL CABLING

1. General

a. Provide cable with electrical conductors of soft drawn annealed copper, bare or tinned, solid or concentric stranded as applies, conductivity not less than 98 percent of pure copper.

b. Comply with applicable Code for insulation, jacket, marking and listing for applicable use.

i. Refer to California Electrical Code, Table 725-61. Cable Uses and Permitted Substitutions.

ii. Manufacturer part number specified is for a Listed Type CM construction to indicate intended cable construction and quality.

c. Code requirements take precedence.

i. Provide type required by Code at no additional cost to the Town.

2. USB Cabling

a. Drawing Reference: USB

b. Features/Functions:

i. Conforms with minimum USB 2.0 standard

ii. Provides USB input in a single gang wall plate

iii. Extends USB signal up to at least 200' or distance as required by project requirements.

c. Manufacturers:

- i. Extron
 - ii. Trulink
 - iii. or equal.
- 3. High Speed, TIA/TIA Category Cabling
 - a. Drawing Reference:** UTP6-4, where ** denotes cable count
 - b. Construction:
 - i. Provide horizontal copper cable in accordance with:
 - a) EIA ANSI/TIA/EIA-568-B.2
 - b) UL 444,
 - c) NEMA WC 66 (Performance Standard for Category 6 and Category 7 100 Ohm Shielded and Unshielded Twisted Pair)
 - d) ICEA S-90-661
 - ii. UTP (unshielded twisted pair),
 - iii. 100 ohm impedance
 - iv. Four each individually twisted pair, 22 or 24 AWG conductors,
 - a) Color code
 - (1) Pair 1 White/Blue Blue
 - (2) Pair 2 White/Orange Orange
 - (3) Pair 3 White/Green Green
 - (4) Pair 4 White/Brown Brown
 - v. No shield in the sheath.
 - vi. Jacket
 - a) Thermoplastic jacket
 - b) Color: Blue unless otherwise indicated.
 - c) Cable imprinted with manufacturers name or identifier, flammability rating, gauge of conductor, transmission performance rating (category designation) at regular intervals not to exceed 2 feet.
 - d) The word "FEET" or the abbreviation "FT" shall appear after each length marking.
 - e) Provide communications general purpose (CM or CMG), communications plenum (CMP) or communications riser (CMR) rated cabling in accordance with NFPA 70.
 - f) Type CMP and CMR may be substituted for type CM or CMG and type CMP may be substituted for type CMR in accordance with NFPA 70.
 - c. Certification
 - i. Warrantied by the manufacturer to provide Category 6 performance when installed in accordance with applicable EIA/TIA standards and when terminated with the jacks supplied by the Contractor for this Project.
 - d. Performance
 - i. Assembly electrically meets or exceeds EIA ANSI/TIA/EIA-568-B.2 Category 6 performance standards
 - e. Manufacturers:
 - i. Berk-Tek LANmark-1000

- ii. Belden/CDT
 - iii. Berk-Tek
 - iv. Commscope/Systimax
 - v. Commscope/Uniprise
 - vi. General Cable
 - vii. Mohawk/CDT
 - viii. Superior/Essex
 - ix. or equal
4. High Speed, Category 6 Cabling, Plenum Rated
- a. Drawing Reference:** UTP6-4P, where ** denotes cable count
 - b. Construction:
 - i. As for non-plenum, with fire retardant overall jacket construction.
 - ii. UL listed, NEC compliant for plenum installation.
 - iii. CSA Certified type PCC FT4 FT6.
 - c. Manufacturers
 - i. As for non-plenum Cat-6, plenum construction.

K. MISCELLANEOUS PRODUCTS

1. Audio and Control Connectors and Related:
- a. Circular Audio Connector, Cord, 3 through 5 contacts, gold plated contacts, captive cable clamp strain relief, matte black chrome finish over nickel metal shell
 - i. Neutrik C-Series, X-Series.
 - ii. Switchcraft.
 - iii. Or equal.
 - b. Circular Audio Connector, Panel mount, male and female devices to fit same panel cutout including fasteners, 3 through 5 contacts, gold plated contacts, matte black chrome finish over nickel metal shell, female receptacles locking type:
 - i. Neutrik D Series Version L.
 - ii. Switchcraft
 - iii. Or equal.
 - c. Loudspeaker Connector, Panel mount, female devices to fit same panel cutout including fasteners as other panel mount receptacles, 4 contacts, matte black finish Polyamid/graphite shell, female receptacles locking type. UL Component Recognized:
 - i. Neutrik NL4MP.
 - ii. Switchcraft
 - iii. Or equal.
2. Video Connectors and Related
- a. Video Connector, BNC type, 75 ohms, Panel, recessed, flush with panel face, insulated from panel, double female
 - i. Manufacturer

- a) Canare BCJ-JRU.
 - b) Tec Nec
 - c) Liberty Wire & Cable/Panelcraft
 - d) or equal.
 - b. Video Connector, BNC type, 75 ohms, Panel, recessed, flush with panel face, insulated from panel, single female to solder pin
 - i. Manufacturer
 - a) Canare BCJ-RU.
 - b) Tec Nec
 - c) Liberty Wire & Cable/Panelcraft
 - d) or equal.
 - c. Video connector, BNC type, 75 ohms, cord, crimp applied. Coordinate with cable.
 - i. Manufacturer
 - a) Amp.
 - b) Amphenol.
 - c) Augat/LRC Products
 - d) Canare.
 - e) Kings.
 - f) Liberty Wire & Cable/Panelcraft
 - g) RFI/Celltronics.
 - h) Trompeter.
 - i) or equal.
 - d. Video Precision 75 ohms Terminator, BNC:
 - i. Manufacturer
 - a) Canare BCP-TA
 - b) Trompeter TNAI-1-75.
 - c) or equal.
 - e. DB15 Connectors
 - i. Drawing Reference HD15
 - ii. Manufacturer
 - a) Amp.
 - b) Amphenol.
 - c) Canare.
 - d) Kings.
 - e) Liberty Wire & Cable/Panelcraft
 - f) RFI/Celltronics.
 - g) or equal.
- 3. Custom Facility Panels, Rackmount Auxiliary Panels, Rack Lighting
 - a. Drawing Reference(s):

- i. MP* - Media Panels, where * is a number indicating the panel type.
 - ii. FP* - Facility Panels, where * is a number indicating the panel type.
 - iii. Aux Panel
- b. Provide connector types and plate finish as shown. If none shown, provide:
 - i. Rack mount panels:
 - a) 16 gauge minimum, cold rolled steel or 1/8" minimum aluminum, finish to match rack finish.
 - b) At contractor's option, fabricate using rack mount panels with Decora/Decorator openings and steel plates with specified connectors. Match insert color to panel color provided. Refer to Rack Panel with Decora Openings below.
 - ii. Wall Panels: 16 gauge minimum cold rolled steel, finish to match surrounding electrical and other low voltage panels.
- c. Manufacturers, Rack Mount Panels
 - i. BGW Systems Inc.
 - ii. Conquest
 - iii. Middle Atlantic Products Universal Connector Panel
 - iv. Middle Atlantic Products Universal Connector Panel, Modular Custom Connector Panel Systems
 - v. ProCo Sound, Inc.
 - vi. Ultimate Plates and Panels
 - vii. or equal.
- d. Manufacturers, Wall Panels
 - i. PanelCrafters Division of Liberty Wire & Cable, Classic Series
 - ii. FSR
 - iii. RCI Systems
 - iv. Middle Atlantic
 - v. Ultimate Plates and Panels
 - vi. Whirlwind
 - vii. Or equal.
- e. Manufacturers, Decora/Decorator connector inserts:
 - i. Connector Plates by Radio Design Labs. Provide specified connectors rear mounted in D-Blank insert for connector combinations not available from RDL.
 - ii. Grey by Pathway Connectivity Solutions. Provide specified connectors rear mounted in 5100 insert for connector combinations not available from Pathway Connectivity Solutions.
 - iii. or equal.
- f. Manufacturers, Rack Mount Decora Panel Openings
 - i. Lowell Manufacturing LD8-RMP with Lowell DBB-4 blank Decora plates at openings not fitted with equipment.
 - ii. Middle Atlantic DECP Series
 - iii. or equal.

- g. Manufacturers, Rack Lighting
 - i. Middle Atlantic PDLT-815RV-RN.
 - ii. or equal.
- L. POWER DISTRIBUTION EQUIPMENT
- A. Comply with applicable Codes. Provide UL Listed devices suitable for commercial use. Provide all junction boxes, raceway, fittings, wire, supports and fastenings as required for complete installation. Contractor to coordinate plug end of selected strip with rack power receptacles installed under the work of Division 16. Unless otherwise noted, provide receptacles of NEMA 5-15R configuration.
 - B. Power Sequencer System
 - 1. Drawing References: PSEQ
 - a. Power Sequencer
 - b. Fire Alarm Interface – provide where required to shunt system operation on receipt of closure from Fire Alarm system.
 - c. Solid State Relay (SSR) SSR1 through SSR7
 - 2. Features
 - a. Power sequencing system.
 - b. Solid state switching, zero crossing.
 - c. Sequencing on power up and power down.
 - d. Front panel button and external closure activation.
 - e. Alarm terminal to sequence the system down when tripped.
 - f. UL Listed.
 - 3. Manufacturer
 - a. FSR Inc. Power Products Group SPC-20 Power Sequencer and SPC-20X Solid State Relay
 - b. Furman
 - c. Or equal.
 - C. Power Supplies and Related:
 - 1. Drawing Reference: PS24.
 - 2. Relay and Lamp Power Supply:
 - 3. 24 VDC, regulated within 5%. Ripple not greater than 1.5%. Output current rating at least 150% of maximum possible load. Circuit breaker or intrinsic over current protection. UL Recognized or UL Listed.
 - D. Full Height Receptacle Strip, One (1) Circuit, 15A
 - 1. Features/Construction:
 - a. Not less than 60" Long
 - b. Not less than eleven (11) 15A receptacles
 - c. Integral circuit breaker
 - d. NEMA 5-15P plug on 6' cord.
 - e. UL Listed Assembly
 - f. Provide mounting hardware as necessary to attach to rack interior.
 - 2. Manufacturers.
 - a. Wiremold Series 7011ULBC.
 - b. Lowell ACS 1524

- c. Geist NSVB200-101S15
 - d. Hubbell PR206
 - e. Leviton
 - f. Middle Atlantic
 - g. Chatsworth 12848-701
 - h. or equal.
- E. Full Height Receptacle Strip, One (1) Circuit, 20A
- 1. Features/Construction:
 - a. Not less than 70" Long
 - b. Not less than eleven (11) 15A receptacles
 - c. Integral circuit breaker
 - d. NEMA 5-20P plug on 6' cord.
 - e. UL Listed Assembly
 - f. Provide mounting hardware as necessary to attach to rack interior.
 - 2. Manufacturers. Contractor to coordinate selected strip with rack power receptacles installed under the work of Division 26.
 - a. Geist NSVB200-102S20
 - b. Hubbell PR20820DRTL
 - c. Leviton P104x series
 - d. Lowell ACS-2024
 - e. Middle Atlantic PD-1020C-NS
 - f. Wiremold Series 7011ULBC20.
 - g. Chatsworth 12848-705
 - h. or equal.
- F. Rackmount Power Panel, Horizontal Mount, User Aux device use:
- 1. Drawing Reference: POWER.
 - 2. Functions/Features:
 - a. Front face of panel shall provide two electrical power outlets and a switch. An indicator lamp shall show the presence of AC power when on. The front face of panel shall have a black finish. The rear face shall provide a minimum of at least four receptacles. The panel shall be racked mounted in a maximum of two rack units. The panel shall be Code approved and UL rated for this application.
 - 3. Manufacturers:
 - a. Hubbell MCCPSS19TS
 - b. Leviton 4515
 - c. Geist SP124-1020
- M. POWER PANEL:
- a. Drawing Reference: POWER.
 - b. Functions/Features:

- i. Front face of panel shall provide two electrical power outlets and a switch. An indicator lamp shall show the presence of AC power when on. The front face of panel shall have a black finish. The rear face shall provide a minimum of at least four receptacles. The panel shall be racked mounted in a maximum of two rack units. The panel shall be Code approved and UL rated for this application.
- c. Manufacturers:
 - i. Hubbell MCCPSS19TS
 - ii. Geist SP124-1020
 - iii. Or equal.

PART 3 - EXECUTION

A. GENERAL

- 1. Perform the Work of this Section in accordance with acknowledged industry and professional standards and practices, and the procedures specified herein.
- 2. Furnish and install (herein, "provide") all materials, devices, components, and equipment required for complete, operational systems.
- 3. Refer to Section 27 15 00 for additional execution requirements that apply to the work of this Section.

B. PRECONSTRUCTION PROGRAMMING MEETING

- 1. Not less than 60 days prior to the scheduled completion of the project, Contractor to initiate a request of the Town's Representative to schedule an Audiovisual Systems programming meeting.
 - a. The Town's Representative will schedule the meeting at the reasonable mutual convenience of the Contractor and the Town's technical systems representatives.
 - b. The purpose of the meeting is for the Town's Representative to indicate to the contractor how the programmable interfaces of the Audiovisual systems are to be implemented, including:
 - i. Integration of VoIP conference dialing into AV controls.
 - ii. Button assignments and labels for physical button panels
 - iii. Touchscreen menu hierarchy, scene arrangement, button and background colors, text size, logos
 - iv. When multiple panels control the same systems, which screens appear on which touchpanels.
 - v. Whether authorization codes or passwords will be required to access special functions/menus.
 - c. Contractor to document the information received from the Town's Representatives at this meeting.
 - d. Contractor to submit the documentation of the requirements meeting, along with their proposed response to the Town's programming requirements in the form of screen shots and system menu flow diagrams as required under Section 27 41 00 – Common Work Results for Audiovisual Systems, 1.4 D Submittals.

C. WIRING CLASSIFICATION AND RELATED

1. Audio Signal Wiring Classification:
 - a. Type A-1: Microphone level wiring less than -30 dB μ , 20 Hz to 20 kHz.
 - b. Type A-2: Line level wiring -30 dB μ to +24 dB μ , 20 Hz to 20 kHz.
 - c. Type A-3: Loudspeaker level or circuit wiring greater than +24 dB μ , from 20 Hz to 20 kHz.
2. Video and Related Signal Wiring Classification:
 - a. Type V-1: Baseband and composite video wiring 1 volt peak-to-peak into 75 ohms, 0 to 10.0 MHz.
 - b. Type V-2: Synchronization and switching pulse wiring 4 volts peak-to-peak into 75 ohms, 15.62 to 15.75 kHz.
 - c. Type V-3: Color subcarrier wiring 0 to 4 volts peak-to-peak into 75 ohms, 3.57 to 4.43 MHz.
 - d. Type V-4: KMVT system wiring 0.1 to 1000 uV peak-to-peak into 50 or 75 ohms, 47 to 890 MHz.
3. Control Signal Wiring Classifications:
 - a. Type C-1: DC control wiring 0 to 50 volts.
 - b. Type C-2: Synchronous control or data wiring 0 to 40 volts, peak-to-peak.
 - c. Type C-3: AC control wiring 0 to 48 volts, 60 Hz.
4. Additional Wiring Classifications:
 - a. Type M-1: DC power wiring 0 to 48 volts.
 - b. Type M-2: AC power wiring greater than 50 volts, 60 Hz.
5. Wiring Combinations:
 - a. Except as indicated herein, conduit, wireways and cable bundles shall contain only wiring of a single classification. The following combinations are acceptable in conduit, or cable harnesses. Additional acceptable combinations may be indicated on the Contract Drawings.
 - i. Types A-1, C-1, and M-1.
 - ii. Types A-2, C-1, C-2, and M-1, runs less than twenty (20) feet.
 - iii. Types A-2, C-1, and M-1.
 - iv. Types A-3, C-1, C-2, and M-1.
 - v. Types A-2, V-1, and V-3.
 - vi. Types V-1, V-2, V-3, and C-1.
 - vii. Types M-2 and C-3.

D. WIRE AND CABLE INSTALLATION

1. Provide permanent identification of run destination at all raceway terminations.
2. All wire and cable shall be continuous and splice-free for the entire length of run between designated connections or terminations.
3. All shielded cables shall be insulated. Do not permit shields to contact conduit, raceway, boxes, panels or equipment enclosures.

4. Within buildings, make splices only in designated terminal cabinets and/or on designated equipment backboards. Outside buildings, make splices only in designated manholes and/or handholes. Protect splices outside of buildings with splicing kits equivalent to Scotchcast Re-enterable. Make splices only with connectors or terminal devices specified herein. Document all splices on Record Drawings.
5. Verify that all raceway has been de-burred and properly joined, coupled, and terminated prior to installation of cables. Verify that all raceway is clear of foreign matter and substances prior to installation of wire or cable.
6. Inspect all conduit bends to verify proper radius. Comply with Code for minimum permissible radius and maximum permissible deformation.
7. Apply a chemically inert lubricant to all wire and cable prior to pulling in conduit. Do not subject wire and cable to tension greater than that recommended by the manufacturer. Use multi-spool rollers where cable is pulled in place around bends. Do not pull reverse bends.
8. Provide a box loop for all wire and cable routed through junction boxes or distribution panels. Provide tool formed thermal expansion loops at cable at manholes, handholes and at both sides of all fixed mounted equipment. Cable loops and bends shall not be bent at a radius greater than that recommended by the manufacturer.
9. Secure all wire and cable run vertically for continuous distances greater than thirty (30) feet. Secure robust non-coaxial cables with screw-flange nylon cable ties or similar devices appropriate to weight of cable. For all other cables, provide symmetrical conforming nonmetallic bushings or woven cable grips appropriate to weight of cable.

E. SIGNAL POLARITY CONVENTION

1. Maintain consistent absolute signal polarity at all connectors, patch points and connection points accessible in the system. Comply with AES26-2001. Where applicable, a positive polarity electrical signal shall yield positive acoustic pressure from the loudspeakers.

2. Audio signal connector convention: Comply with AES 14-1992 (r1998)

Signal	Connector	Wire
Signal Phase	Pin 2	Red or White
Signal Anti-Phase	Pin 3	Black
Signal Ground	Pin 1	Drain Wire

3. Video and RF/KMVT Connector Convention:

Signal	Connector	Wire
Signal Phase	Center Pin	Center conductor
Signal Anti-Phase	Shell	Shield
Signal Ground	Shell	Shield

F. WIRING PRACTICE

1. Land all non-coaxial field wiring entering each equipment rack at specified terminal devices prior to connection to any equipment or devices within racks. At Contractor's option, such terminals may be located in the equipment racks or in the terminal cabinets provided. Coordinate such selection with Project construction sequence and test procedures specified herein.

2. Identify all wire and cable clearly with permanent labels wrapped about the full circumference within one (1) inch of each connection. Indicate the number designated on the associated field or shop drawing or run sheet, as applies. Assign wire or cable designations consistently throughout a given system. Each wire or cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations. Conform with the requirements of Section 27 41 00.
3. Apply all crimp connectors only with manufacturer's recommended ratchet type tooling and correct crimp dies for connector and wire size. Plier type crimp tooling shall not be acceptable.
4. Coordinate insulation displacement (quick connect) terminal devices with wire size and type. Comply with manufacturer's recommendations. Make connections with automatic impact type tooling set to recommended force.
5. Make all connections to screw-type barrier blocks with insulated crimp-type spade lugs. Lugs are not required at captive compression terminal type blocks. Provide permanent designation strips designed for use with the terminal blocks provided. Make neat, intelligible markings with indelible markers equivalent to "Sharpie".
6. Tin terminated shield drain wires and insulate with heat shrinkable tubing.
7. Use only rosin core 60/40 tin/lead solder for all solder connections.
8. Dress, lace or harness all wire and cable to prevent mechanical stress on electrical connections. No wire or cable shall be supported by a connection point. Provide service loops where harnesses of different classes cross, or where hinged panels are to be interconnected.
9. Termination and build-out resistors and related circuit correction components shall be visible. Do not install in connector shells or internally modify equipment. Show locations on Record Drawings.
10. Correct any and all of the following unacceptable wiring conditions:
 - a. Deformed, brittle or cracked insulation.
 - b. Insulation shrunken or stripped further than 1/8" away from the actual point of connection within a connector, or on a punch block.
 - c. Cold solder joints.
 - d. Flux joints.
 - e. Solder splatter.
 - f. Un-grommeted, un-bushed, or uninsulated wire or cable entries.
 - g. Deformation or improper radius of wire or cable.

G. SIGNAL GROUNDING PROCEDURES

1. Comply with National Electrical Code.
2. Unless otherwise noted maintain a unipoint ground scheme.
3. Signal and electrical system grounds shall be isolated except at the Project ground field connection.
4. Equipment enclosures shall not be permitted to touch each other unless bolted together and electrically bonded.
5. Ground and bond equipment racks and similar equipment enclosures containing powered equipment exclusively via the ground conductors provided under Division 27.

6. At each rack, provide a ground bus within the rack. At each rack, provide a lug bonded to the rack frame with a #12 TW stranded wire to the rack Ground bus.
7. At each ensemble of racks, provide a single labeled Ground tubular-clamp bus bar terminal strip to land the individual rack Isolated Ground bus ground conductors. Connect the main Isolated Ground conductor from the Technical Power panelboard at this point.
8. Equipment signal ground shall be to the Ground System via the green wire of the equipment power cord. Where equipment uses two (2) wire power cord, provide #12 green bond wire to rack ground bus bar. At equipment, provide crimp lug and suitable hardware for bonding.
9. Shielded cables of this section shall be grounded exclusively to Isolated Ground by a single path. Shield shall be tied to Ground at one end only, i.e., at the low potential (receiving) end of run, unless otherwise noted.
10. Unless otherwise noted, at audio jackfields, tie source shield at jackbay frame. Float shields at connections to output jacks. Bus each row of jack frames and run individual #12 green ground wire for each row to rack IG bus bar.
11. Signal Ground provisions shall realize less than 0.15 ohms to the primary ground connection.

H. FINISHES

1. Finishes and materials for contractor fabricated assemblies such as racks, custom control panels, brackets, blank panels, equipment mounting in furniture or casework, speaker baffles, speaker grille material and in general any item or component herein which is visible shall adhere to the following:
 - a. Finish shall be as directed by the Town's Representative.
 - b. In the event that the Town's Representative provides no direction as to finish, finish shall match exactly the surrounding and adjacent surfaces.
 - c. Wooden speaker back boxes and baffles shall be painted flat black if not otherwise finished or stained.

I. EQUIPMENT ENCLOSURE (RACK) AND EQUIPMENT FABRICATION

1. Combustible material, other than incidental trim of indicated equipment, is prohibited within equipment racks.
2. Within each equipment enclosure, provide a full-height multi-circuit ground outlet strip with branch circuit count as shown on drawings; locate on the left side of the equipment enclosure, as viewed from the rear. In each enclosure provide number of receptacles required by present and future equipment indicated on drawings, plus at least two spare receptacles. Provide flexible steel raceway and junction box for connection of power service. Bond internal raceway to rack frame.
3. Provide a permanent label on the front of each equipment rack including the rack designation, and the circuit breaker number and associated electrical distribution panel designation servicing same.
4. Maintain separation of wiring classifications as specified herein. Separately dress, route and land microphone and line level cables and related on the right side of the equipment enclosure, as viewed from the rear; dress, route, and land loudspeaker level and control cables on the left side of the equipment enclosure, as viewed from the rear.

5. Access shall not require demounting or de-energizing of equipment. Install access covers, hinged panels, or pull-out drawers to insure complete access to terminals and interior components.
6. Fasten removable covers containing any wired component with a continuous hinge along one side, with associated wiring secured and dressed to provide an adequate service loop. Provide an appropriate stop locks to hold all hinged panels and drawers in a serviceable position.
7. Provide permanent labels for all equipment and devices. Where possible, fasten such labels to the rack frame or to blank or vent panels which will remain in place when active equipment is removed for possible service.
8. At jackfields, provide service loop to permit removal of jackfields from rack sufficient to conveniently access all jack contacts for routine cleaning and maintenance. Organize the service loop and harness such that reasonable reconnection of jacks and jack normals is possible without cutting apart the harness.
9. Coordinate the design and execution of wire harnessing of multi-bay rack ensembles with conditions of delivery to installation locations at Project Site, and with the requirement herein for test of the completely wired system in the shop prior to delivery to the Project Site. Organize the wiring harnesses such that they will fold within one shippable unit without risk of damage, or provide polarized multipin connectors and related interconnect systems as specified elsewhere herein.
10. At each equipment backboard, provide UL Listed surge suppressing multioutlet assembly with at least six (6) receptacles.

J. EQUIPMENT RACK AND EQUIPMENT TESTING AND ADJUSTING PROCEDURES

1. Conduct procedures in fabrication shop. Verify safe and proper operation of all components, devices, or equipment, establish nominal signal levels within the systems and verify the absence of extraneous or degrading signals. Make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltages at key system interconnection points, gains and losses, as applicable. Submit test report. Request and coordinate verification of submitted test data by the Town's Representative. Correct all non-conforming conditions prior to shipment to Project Site. Perform at least the following procedures:
2. Preliminary: Verify:
 - a. Grounding of devices and equipment. Integrity of signal and electrical system ground connections.
 - b. Proper provision of power to devices and equipment.
 - c. Integrity of all insulation, shield terminations and connections.
 - d. Integrity of soldered connections. Absence of solder splatter, solder bridges.
 - e. Absence of debris of any kind, tools, etc.
 - f. Routing and dressing of wire and cable.
 - g. All wiring, including polarity and continuity, including conformance with wire designations on running sheets, field and shop drawings.
 - h. Mechanical integrity of all support provisions.
3. Rig temporary power and grounding. Comply with all applicable Codes, regulations and ordinances.
4. Determine the proper sequence of energizing systems to minimize the risk of damage. Energize. Burn in for at least 168 hours.

5. Sound Systems:
 - a. Gain control settings: Establish tentative normal settings for all gain controls. Set all equalizers flat. Set all automatic gain control devices to bypass. Terminate power amplifier outputs with power load resistors with resistance value within 10% the nominal output impedance of the respective amplifier. Adjust all gain controls on equipment for optimum signal-to-noise ratio and signal balance and, unless they are sub-panel mounted, cap them to prevent tampering. Unless specified or directed otherwise, adjust gains such that in a given system the "front end" operates at unity gain and maintains 10 dB of clip margin referenced to the first onset of clipping of the associated power amplifier(s). Measure and document system gains at 1 kHz. Settings may require further adjustment by the Contractor, a result of testing by the Town's Representative.
 - b. Freedom from parasitic oscillation and radio frequency pickup: Maintain previous setup. Set up for each mode of operation specified in the functional requirements; verify that all systems are free from spurious oscillation and radio-frequency pickup using broadband oscilloscope. Correct any such defects.
 - c. Hum and noise level/signal to noise level/signal to crosstalk level: Maintain previous setup. Terminate microphone and line-level inputs with shielded resistors of 150 and 600 ohms, respectively. Set available variable gain controls such that full power amplifier output would be achieved with -40 dBm input level at a microphone input and +12 dBm at a line-level input. Measure and document the specified parameters of the system overall for each microphone input channel and line-level input channel. Compare with nominal signal level.
 - d. Total Harmonic Distortion: Maintain previous setup. Measure at reference operating level at least at 63 Hz, 125 Hz, 1 kHz, 10 kHz.
6. Baseband Video Systems:
 - a. Picture Monitors:
 - i. Apply crosshatch. Verify linearity.
 - ii. Apply red field. Adjust purity.
 - iii. Apply SMPTE bars and PLUGE. Adjust to standards.
 - b. Video Path Test: Use manufacturer's procedures. Use full field or line signals.
7. Data/Graphics Systems:
 - a. Projector:
 - i. Apply crosshatch. Converge at design distance. Verify linearity.
 - ii. Apply red, green and blue field. Adjust purity.
 - b. Wideband Component Analog Video Path Test: Use manufacturer's procedures.
8. Control System:
 - a. Demonstrate complete operation.

K. PROJECTION SCREEN INSTALLATION

1. Inspection

- a. General: Examine surfaces and rough framing to determine suitability to install screen and mount. Do not start work until unsatisfactory conditions are corrected.
- 2. Installation
 - a. Install screen and projector mount horizontal and plumb for proper operation per manufacturer's recommendations. Securely anchor to supporting structure to withstand all loading conditions and strain of service.
- 3. Adjustment
 - a. Adjust units as required for smooth operation and alignment as required.
 - b. Just prior to final acceptance of project, clean the screen surface according to the manufacturer's instructions.
 - c. Protect completed work from damage until acceptance by the Town's Representative.

L. LOUDSPEAKER ASSEMBLY INSTALLATION

- 1. Loudspeakers:
 - a. Verify proper installation of loudspeaker enclosures and related support.
 - b. Verify that no loudspeaker assembly is subjected to stresses or loading effects in any way contributing to possible extraordinary failure.

M. VIDEO PROJECTOR ASSEMBLY INSTALLATION

- 1. Design, engineer and provide complete, all means of support, suspension, attachment, fastening, bracing, and restraint (hereinafter "support") of such equipment. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction. Submit in timely manner.
- 2. Comply with applicable Code and the requirements of the Authorities having jurisdiction.
- 3. Provide safety factor greater than six (6) or as required by Code, whichever is greater.
- 4. Do not apply any load to building structure without first obtaining written approval of the Town's Representative. Obtain per Project procedures.
- 5. During Acceptance Testing, adjust orientation of Video Projector as directed to achieve optimum picture. Provide workers and ladders as required. Perform such adjustment with no claim for additional cost or time.

N. SYSTEMS PERFORMANCE TESTING AND ADJUSTING PROCEDURES

- 1. Upon completion of the installation of all equipment in an area, perform the following tests and record results. Verify safe and proper operation of all components, devices, or equipment, establish nominal signal levels within the systems and verify the absence of extraneous or degrading signals. Make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltages at key system interconnection points, gains and losses, as applicable. Submit test report. Correct all non-conforming conditions prior to requesting Acceptance Review and Testing. Perform at least the following procedures:
 - a. Mechanical: Verify:
 - i. Integrity of all support provisions.
 - ii. Absence of debris of any kind, tools, etc.
 - b. Power and Isolated Ground: Verify:

- i. Isolation of Isolated Ground system from raceway and related ground.
 - ii. Grounding of devices and equipment. Integrity of signal and technical power system ground connections.
 - iii. Proper provision of power to devices and equipment.
- c. Signal Wiring: Verify:
 - i. Integrity of all insulation, shield terminations and connections.
 - ii. Integrity of soldered connections. Absence of solder splatter, solder bridges.
 - iii. Routing and dressing of wire and cable.
 - iv. Continuity, including conformance with wire designations on running sheets, field and shop drawings.
 - v. Absence of ground faults.
 - vi. Polarity.
- d. Use the proper sequence of energizing systems to minimize the risk of damage. Energize.
- e. Sound Systems, Electronic Tests; confirm:
 - i. Gain at 1 kHz.
 - ii. Maximum output.
 - iii. Input clipping level.
 - iv. Frequency response.
 - v. Total harmonic distortion.
 - vi. Signal to noise ration.
 - vii. Signal to crosstalk ratio.
- f. Electro/Acoustic Tests:
 - i. Uniformity of coverage.
 - ii. Electronic and acoustic frequency response/one-third octave equalization. Measure at ear level. Comply with applicable portions of ANSI (SMPTE) PH22.202M-1984, "B chain electro-acoustic response - control rooms and indoor theaters." Adjust to "curve X of B chain characteristic". Town's Representative will direct final adjustment.
 - iii. Maximum continuous sound pressure level (in the reverberant field). Drive systems with broadband pink noise. Sustain for at least five (5) minutes with no system damage. Measure for "A" and "C" weightings at ear level on loudspeaker axis. Turn off noise.
 - iv. Acoustic signal-to-noise ratio referenced to the specified maximum continuous sound pressure level in the reverberant field. Measure for "A" and "C" weightings at ear level on loudspeaker axis with mechanical systems operating. Present comparison with previous measurement.
- g. Video Systems:
 - i. Picture Monitors:
 - a) Apply crosshatch. Verify linearity.
 - b) Apply red field. Adjust purity.
 - c) Apply SMPTE bars and PLUGE. Adjust to standards.
 - ii. Video Path Test: Use NTC Report No. 7 procedures. Use full field or line signals.

- a) Insertion Gain.
- b) Gain/Frequency Distortion.
- h. Control System: Demonstrate complete operation.

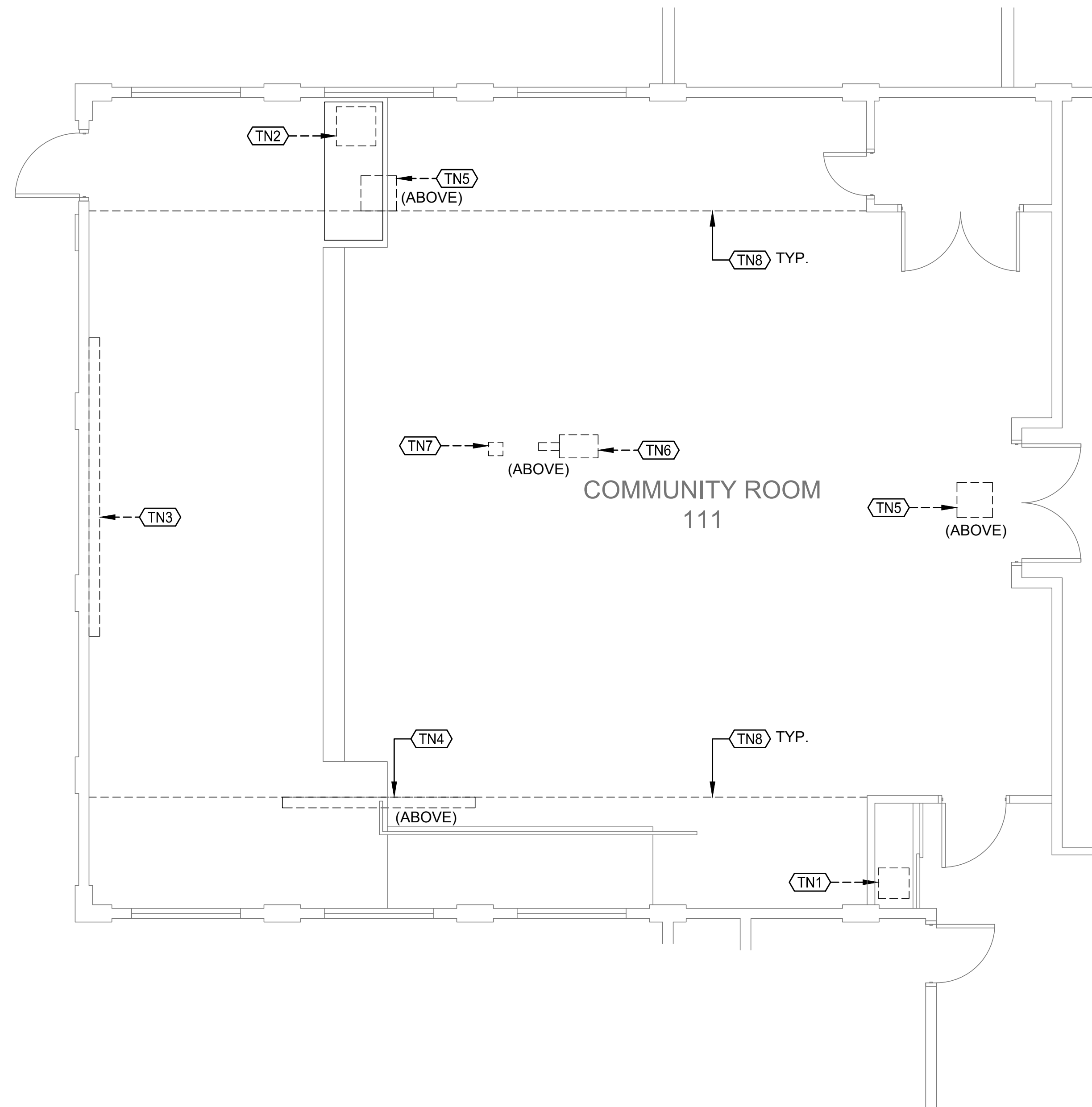
O. LABELING

- 1. Conform with the requirements of Section 27 41 07 – Identification for Audiovisual Systems.
- 2. Provide permanent "wedge" type labels on all controls, as applies, to indicate correct settings after systems performance testing and adjustment procedures have been successfully completed.

END OF SECTION

Attachment 3

TA-101 and TA-701 are amended as follows:



1 COMMUNITY ROOM DEMO PLAN
1/4" = 1'-0"

KEYNOTES

- TN TELECOMMUNICATIONS: WORK OF DIVISION 27.
- TN1** REMOVE (E) WALL-MOUNTED AV RACK FROM UTILITY CLOSET. COORDINATE DISPOSITION OF (E) AV EQUIPMENT IN RACK W/ CITY REPRESENTATIVE. REMOVE ASSOCIATED OBSOLETE AUDIOVISUAL CABLING AND PATHWAY FROM INTERIOR OF UTILITY CLOSET.
- TN2** REMOVE (E) CREDENZA AV RACK FROM ADMIN DESK. COORDINATE DISPOSITION OF (E) AV EQUIPMENT IN RACK W/ CITY REPRESENTATIVE. REMOVE ASSOCIATED OBSOLETE AUDIOVISUAL CABLING AND SURFACE RACEWAY FROM INTERIOR OF STAFF DESK.
- TN3** REMOVE (E) WALL-MOUNTED PROJECTION SCREEN.
- TN4** REMOVE (E) FLUSH CEILING-MOUNTED PROJECTION SCREEN.
- TN5** REMOVE (E) PROJECTOR, SHELF, AND MOUNTING HARDWARE. PATCH AND REPAIR EXISTING FINISHES AS REQUIRED.
- TN6** REMOVE (E) SUSPENDED LOUDSPEAKERS FROM NAVE.
- TN7** REMOVE (E) CEILING-MOUNTED FIXED DOCUMENT CAMERA. PRESERVE IN PLACE (E) MOUNTING HARDWARE/POINT-OF-ATTACHMENT TO STRUCTURE.
- TN8** (E) FLUSH MOUNTED LOUDSPEAKERS IN CLERESTORY TO BE ABANDONED IN PLACE. DISCONNECT WIRING AT SOURCE.

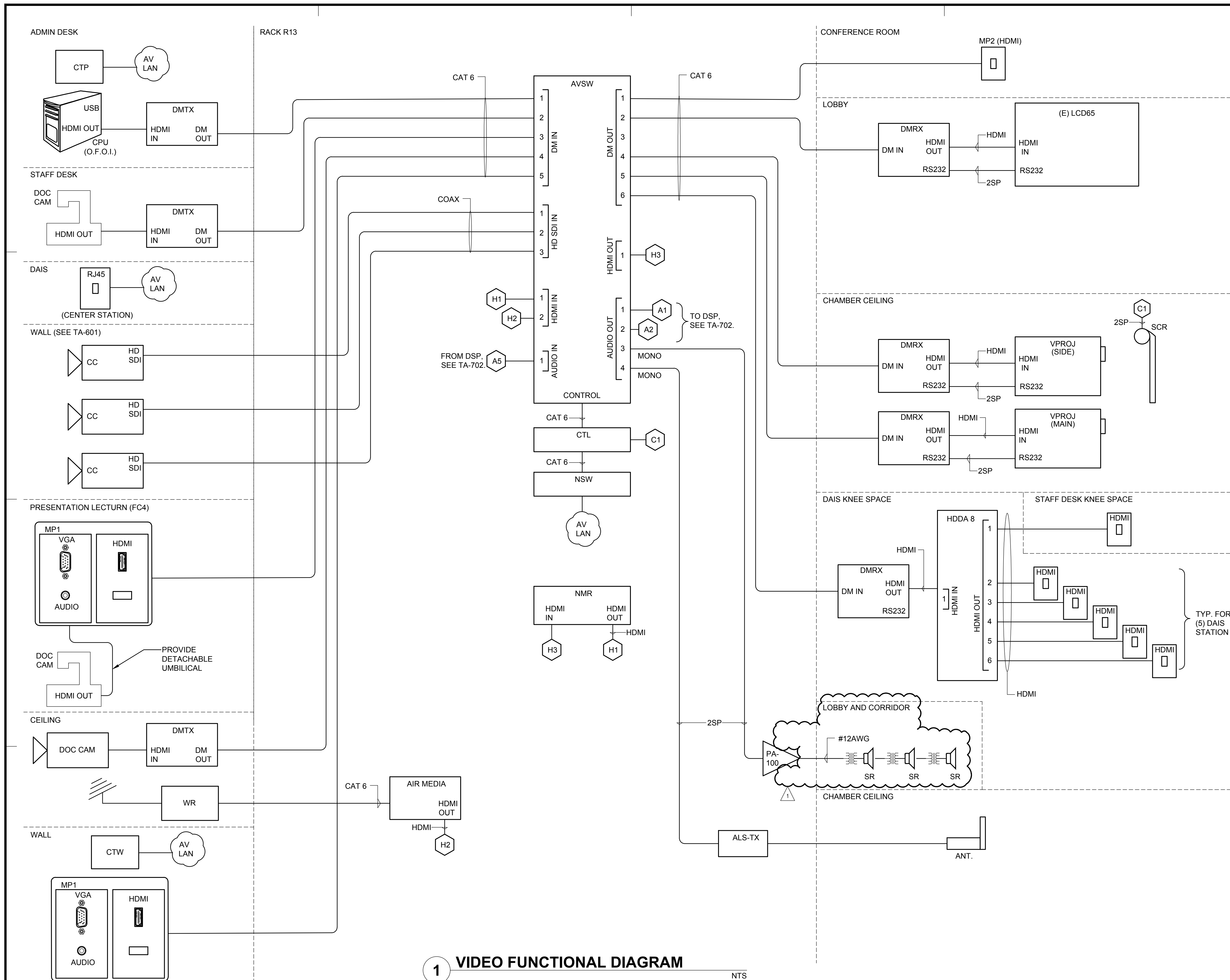
Smith, Fause & McDonald Inc.
Communications Engineering Group
351 8th Street
San Francisco, California 94103
(415) 255-9140 Fax: (415) 255-9180

NO	REVISION DESCRIPTION	DATE
	100 % Construction Documents	06/15/2018
	BID SET	01/07/2019
△	ADDENDUM 1	02/13/2019

PROJECT
TOWN OF HILLSBOROUGH
TOWN HALL AV UPGRADES
1600 Floribunda Ave, Hillsborough, CA 94010

SHEET
COMMUNITY ROOM DEMO PLAN

SCALE	FOR 24" x 36" SHEET
JOB NUMBER 2001020A	DRAWING TA101
DRAWN BY IK, SC, AC	
DESIGNED BY TSH	
DATE 01-07-2019	SHEET OF



1 VIDEO FUNCTIONAL DIAGRAM

NTS

NO	REVISION DESCRIPTION	DATE
100	% Construction Documents	06/15/2018
	BID SET	01/07/2019
△	ADDENDUM 1	02/13/2019

PROJECT
TOWN OF HILLSBOROUGH
 TOWN HALL AV UPGRADES
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SHEET
VIDEO FUNCTIONAL DIAGRAM

SCALE	FOR 24" x 36" SHEET
JOB NUMBER	2001020A
DRAWING	
DRAWN BY	IK, SC, AC
DESIGNED BY	TSH
DATE	01-07-2019
SHEET	OF

TA-701

END OF DOCUMENT